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**FINAL MONITORING WELL INSTALLATION, DESTRUCTION,  
REHABILITATION, AND REPAIR WORK PLAN**

01/03/2019  
TREVET, INC.

Approved for public release: distribution unlimited.



**Naval Facilities Engineering Command Southwest  
BRAC PMO West  
San Diego, California**

**FINAL**

# **Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan**

**Hunters Point Naval Shipyard  
San Francisco, California**

**January 2019**

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**DCN: TRVT-2004-0000-0016**

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**Hunters Point Naval Shipyard  
San Francisco, California**

**January 2019**

**Prepared for:**



**Department of the Navy  
Naval Facilities Engineering Command Southwest  
BRAC PMO West  
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**Contract Number: N62473-16-C-2004  
DCN: TRVT-2004-0000-0016**

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**FINAL**

**Well Installation, Destruction, Rehabilitation, and Repair Workplan  
Hunters Point Naval Shipyard  
San Francisco, California**

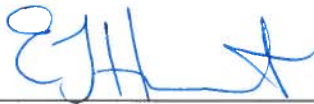
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**Prepared for:  
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***Review and Approval***

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Erin Hunter  
Project Manager  
Trevet



01-03-2019

Date

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### ***Acronyms and Abbreviations***

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BRAC	Base Realignment and Closure
BGMP	Basewide Groundwater Monitoring Program
Bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	contaminants of concern
DON	Department of the Navy
DOT	U.S. Department of Transportation
HPNS	Hunters Point Naval Shipyard
HSA	hollow-stem auger
IDW	investigation-derived waste
IR	Installation Restoration
NAVFACT SW	Naval Facilities Engineering Command, Southwest
PG	professional geologist
PVC	polyvinyl chloride
SFDPH	San Francisco Department of Public Health
UCs	utility corridors
U.S. EPA	U.S. Environmental Protection Agency
USCS	Unified Soil Classification System
VOC	volatile organic compound

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## **Section 1 Introduction**

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This work plan presents the approach for installing, destroying, rehabilitating, or repairing monitoring wells at Hunters Point Naval Shipyard (HPNS), San Francisco, California (Figure 1 and 2). This work plan has been prepared pursuant to the Navy's Installation Restoration (IR) Program, which encompasses the Navy's Base Realignment and Closure (BRAC) Program, and in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986. Trevet prepared this work plan on behalf of the Department of the Navy (DON), Naval Facilities Engineering Command, Southwest (NAVFAC SW), under Contract No. N62473-16-C-2004.

### **1.1 Work Plan Organization**

This work plan provides a general description of the site, activities to be performed, current and proposed well locations, project management tasks, and anticipated project schedule for installation and development, destruction, rehabilitation, and repairing of wells boxes or mounts on existing monitoring wells at HPNS (Figure 3).

This work plan is organized as follows:

- Section 1.0 Introduction
- Section 2.0 Background Information
- Section 3.0 Scope of Work
- Section 4.0 Waste Management Procedures
- Section 5.0 Reporting
- Section 6.0 References

The following appendices are included:

- Appendix A: Field Forms
- Appendix B: Previous Site Boring Logs
- Appendix C: Regulatory Correspondence

The work under this work plan will be conducted by Trevet, and all work will be overseen by a California-licensed professional geologist (PG).

### **1.2 Summary**

Basewide groundwater monitoring is currently under way at HPNS. Contaminants of concern (COCs) have been reported in groundwater relating to historical uses by the DON throughout the site. Currently, there are 143 wells in the groundwater monitoring network and 213 wells in the groundwater gauging network as part of the Basewide Groundwater Monitoring Program (BGMP). The overall goal of the BGMP at HPNS is to monitor these COCs that have or may



have contaminated groundwater at concentrations that pose a risk to human health and the environment.

The BGMP at HPNS has been organized to meet specific goals that are based on previous documents at HPNS to manage monitoring of regulated contaminants in groundwater (Trevet 2017). Some of these wells are in poor condition or have been destroyed or buried during construction activities. These wells should be repaired or replaced so they can continue to provide reliable environmental data. Additionally, supplemental wells have also been recommended to be installed at HPNS to assist with ongoing remedial activities (Table 1).

The objective of this project is to support the ongoing monitoring of groundwater at HPNS. The task for this scope of work are to:

- Perform a geophysical survey for underground utilities
- Destroy two monitoring wells
- Drill, install, and complete 12 monitoring wells
- Rehabilitate two monitoring wells
- Replace well boxes or mounts at 13 monitoring wells
- Survey the 12 new monitoring well locations and monitoring wells where the well boxes were replaced if deemed necessary.
- Prepare a report documenting all installation, destruction, rehabilitation, and repair activities.

These, and any additional well destruction or installation activities will be presented to the regulatory agencies in a BGMP monitoring well destruction and installation technical memorandum. These well destruction and installation activities will follow the guidelines and procedures outlined in this work plan. The BGMP monitoring well destruction and installation technical memorandum will be documented in the subsequent groundwater monitoring report after discussion with regulatory agencies.

## **Section 2 Background Information**

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The following subsection briefly describe HPNS, including the locations and site features, history, geology and surface soil, and hydrogeology. All background information in the following subsections was obtained from the Monitoring Naturally Attenuation Sampling and Analysis Plan (Trevet 2017).

### **2.1 History**

HPNS is located on a peninsula that extends into San Francisco Bay in the southern part of San Francisco, California (Figure 1). In 1940, the Navy obtained ownership of HPNS for shipbuilding, repair, and maintenance activities. After World War II, activities at HPNS shifted to submarine maintenance and repair. HPNS was also the site of the Naval Radiological Defense Laboratory. HPNS property was included on the National Priorities List in 1989 pursuant to CERCLA as a result of past shipyard operations that had left hazardous substances on site. In 1991, HPNS was designated for closure pursuant of the Defense Base Closure and Realignment Act of 1990. The mission of the BRAC Program Management Office is to expeditiously and cost effectively provide all services necessary to realign, close, and dispose of Navy BRAC properties. Site characterization and remedial activities have been conducted at HPNS since 1984.

In 1992, the Navy divided HPNS into five contiguous parcels (identified as Parcels A through E) to expedite remedial action and land reuse. In 1996, the Navy designated Parcel F, which encompasses the offshore areas and a small portion of the onshore areas adjacent to San Francisco Bay. In September 2004, the landfill area in Parcel E was designated as Parcel E-2. Subsequently, Parcel A was transferred to the City and County of San Francisco for redevelopment. In July 2008, the Navy restructured HPNS into seven onshore parcels (B, C, D-1, D-2, E, E-2, and G), three onshore utility corridors (UCs) (UC-1, UC-2, and UC-3), and one offshore parcel (F). In 2009, the Navy restructured Parcel B into three separate parcels, resulting in the current 12 contiguous management parcels at HPNS (Parcels IR07/18, B-1, B-2, C, D-1, D-2, E, E-2, G, UC-1, UC-2, and UC-3).

### **2.2 Geology**

The peninsula that forms HPNS is within a northwest-trending belt of Franciscan Complex bedrock known as the Hunters Point Shear Zone. HPNS is underlain by five geologic units, the youngest of Quaternary age; the oldest, the Franciscan Complex bedrock, of Jurassic Cretaceous age. The stratigraphic sequence of these geologic units, from youngest (shallowest) to oldest (deepest), generally consists of artificial fill, undifferentiated upper sands, Bay Mud, undifferentiated sediments, and Franciscan Complex bedrock. Artificial fill and bedrock are the

most likely units to be encountered above 10 feet below ground surface (bgs), but other units, such as Bay Mud, may be observed along the railroad right-of way.

The Franciscan Complex contains a variety of rock types, including basalt, chert, sandstone, shale, and serpentinite. Some of these rock types contain wide-ranging concentrations of naturally occurring metals; serpentinite also contains naturally occurring asbestos minerals.

## **2.3 Hydrogeology**

The hydrostratigraphic units at HPNS include the A-aquifer, the B-aquifer, and the bedrock water-bearing zone. An aquitard composed of the Bay Mud separates the A-aquifer from the B-aquifer across most of HPNS. General descriptions of the hydrostratigraphic units at HPNS are presented below.

The A-aquifer primarily consists of heterogeneous artificial fill but may also include undifferentiated upper sands, sandy units within the Bay Mud, and the upper weathered bedrock zone, where the A-aquifer directly overlies bedrock. The A-aquifer is generally unconfined through most of HPNS, but semi-confined conditions may exist in places where fine-grained sediments below the water table overlie more permeable materials. Depth to groundwater ranges from about 5 to 20 feet bgs, with an average depth to groundwater of approximately 10 feet bgs.

Bay Mud acts as an aquitard that typically separates the A-aquifer from the underlying B-aquifer. The Bay Mud deposits consist of highly plastic clay and sandy clay and generally thicken from zero feet near the historical shoreline to more than 50 feet near the bay margin. The Bay Mud aquitard is absent in several locations across HPNS and in areas of bedrock highs.

The B-aquifer consists of undifferentiated sediments, in a sequence of relatively thick (about 40 to 60 feet), laterally continuous layers of sand and silty sand and clayey sand, which are separated by laterally continuous layers of silt and clay. The lower portions of the B-aquifer are overlain by layers of silts and clay; therefore, it is less likely to be affected by contamination from site activities. The upper most portion of the B-aquifer generally corresponds to the upper 20- to 40-foot-thick layer of sand and silty sand of undifferentiated sedimentary deposits. The B-aquifer is generally confined by the Bay Mud aquitard, which separates it from the A-aquifer across most of HPNS. The A- and B-aquifers are in hydraulic communication and behave as a single aquifer in areas where the aquitard is absent.

Deeper portions of saturated fractured bedrock that are not in direct contact with the A- or B-aquifers are hydrostratigraphically classified as the bedrock water-bearing zone. The fractured, unweathered bedrock is not considered an aquifer because of its limited flow capabilities and low storage capacity.

Primary sources of recharge from the A-aquifer are infiltration of precipitation and runoff, leakage from utility supply lines, intrusion of bay water, horizontal flow of groundwater from upgradient areas, and vertical flow of water from the B-aquifer. The primary sources of recharge for the B-aquifer include infiltration of precipitation and runoff and horizontal groundwater flow from upgradient areas. The bedrock water-bearing zone likely discharges into the B-aquifer at upgradient contacts and is recharged by infiltration of precipitation at landward outcrop areas.

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## **Section 3    Scope of Work**

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This section summarizes the monitoring well installation, destruction, rehabilitation, and repair work at HPNS. The drilling activities include the following work elements:

- Health and Safety
- Pre-Drilling Activities
- Monitoring Well Installation
- Monitoring Well Destruction
- Monitoring Well Rehabilitation
- Monitoring Well Box Repairs
- Post-Drilling Activities

### **3.1    Health and Safety**

Trevet will conduct field work in accordance with the Accident Prevention Plan prepared for this project (Trevet 2016). The plan describes the safety requirements for drilling and related activities at the subject site. A copy of the plan will be available on-site during work and will include an emergency contact list and hospital route map.

### **3.2    Pre-Drilling Activities**

Prior to field work, Trevet will obtain concurrence from the agencies for all wells proposed for installation and destruction. The proposed well locations for installation, destruction, rehabilitation, and repairs will be staked and the following activities will be completed:

- Review proposed well locations for installation, destruction, rehabilitation, and repairs with NAVFAC SW personnel.
- Notify Underground Service Alert at least 3 days before field work.
- Provide field work notifications and obtain necessary utility clearances from a geophysical utility locator.
- Conduct a geophysical survey for underground utility clearance.
- Prepare the investigation-derived waste (IDW) staging area.

Permits from the San Francisco Department of Public Health (SFPDH) for monitoring well installation and destruction will not be obtained per the CERCLA permit waiver. Substantive requirements of state and local regulations will be followed.

All IDW will be staged in Parcel C; soil and water will be containerized in Department of Transportation 55-gallon drums that have been set up with secondary containment (Figure 3). For IDW generated in a radiologically controlled area Trevet will coordinate with the Navy and the Navy's radiological contractor regarding requirements for radiological screening before removal from the radiologically controlled area and disposal.

### **3.3 Monitoring Well Destruction**

Two groundwater monitoring wells (IR01MWI-7 and IR01MW53B) that have been compromised as a result of on-site remedial activities, are proposed to be destroyed (Figure 3). These monitoring wells will be reinstalled, so they can be sampled as part of the BGMP (see Section 3.4.2). These monitoring wells will be decommissioned in accordance with the State of California Well Standard Bulletins 74-81 and 74-90 (DWR 1981 and 1991) and City of San Francisco requirements.

Monitoring wells will be decommissioned by overdrilling to the total depth using 8- to 10-inch diameter augers, depending on the well casing diameter. A hollow-stem auger (HSA) or sonic rig operated by a California licensed drilling contractor will perform the work under Trevet supervision. After the total depth has been reached, the well casing, sand, and annular material will be removed, and the boring will be backfilled with cement-bentonite grout. A tremie pipe will be placed at the bottom of the borehole and pressurized cement-bentonite grout will be forced out through the tremie pipe up the inside of the borehole. The bottom of the tremie pipe will be kept submerged in the grout column while slowly withdrawing the tube as the borehole fills with grout. The surface will be patched with either cold asphalt, concrete, dirt, or grass to match the surrounding area. The overdrilling method described for well destruction is preferred by the SFDPH and complies with California water well standards (DWR 1981 and 1991).

IDW from soil and well material generated during these activities will be stored in roll-off bins. Decontamination water will be containerized in a trailer-mounted tank and stored in the designated IDW staging area. The IDW will be characterized, profiled, transported, and disposed of as described in Section 4.

### **3.4 Monitoring Well Installation**

Trevet will install groundwater monitoring wells under the direct supervision of a California PG, and the geology encountered during drilling will be documented on a geological log using the Unified Soil Classification System (USCS). Additionally, the wells will be installed in accordance with State of California Well Standard Bulletins 74-81 and 74-90 (DWR 1981 and 1991) and City of San Francisco requirements. Well construction specifics will be determined by the on-site PG based on the lithology observed.

### **3.4.1 New Monitoring Well Installation**

Trevet will install two new groundwater monitoring wells (IR28MW276A and IR28MW277A) to support ongoing remedial activities at HPNS (Figure 4). These wells are going to be drilled to approximately 20 feet below ground surface and will be screened in the A-Aquifer in Parcel C; the screened interval will be approximately 10 to 20 feet below ground surface. Actual screened interval depth may vary depending on the lithology and depth to groundwater at each location.

The borings will be advanced using either HSA or sonic drilling equipment. Before drilling, each boring will be advanced by hand auger to approximately 5 feet bgs to check for utilities. After drilling, down-hole equipment will be decontaminated by pressure-washing methods.

During drilling, the boring will be continuously cored and soil described by the site geologist using the USCS, and soil will be screened for volatile organic compounds (VOCs) using a photoionization detector. Once the total target depth is reached, the geologist will review the boring log to identify the zone of highest permeability. The drillers will then backfill the boring from total depth to approximately 1 foot below the permeable zone. The lower part of the boring will be backfilled with cement-bentonite slurry using the auger as a tremie pipe. Next, the driller will add approximately 6 inches of sand to the bottom of the boring and then install a 4-inch-diameter monitoring well using Schedule 40 polyvinyl chloride (PVC) casing and up to 10-feet of screen with 0.02-inch machine-cut slots. The well string will be suspended during construction so that it does not sink into the lower seal material. The main goal is to screen the zone assumed to be the most permeable in the A-aquifer. Replacement monitoring wells will be constructed as similar as feasibly possible to the wells they are superseding.

After the well string is suspended in the borehole, a filter pack consisting of #3 sand or similar material will be placed from total depth to 2-feet above the top of the screened interval. The well will be surged for a minimum of 30 minutes to settle the filter pack. An annular transition seal will be constructed above the filter pack using at least 2 feet of commercially-manufactured, solvent-free, uncoated sodium bentonite pellets and hydrated in place using potable water. The transition seal will consist of bentonite pellets or chips that will be hydrated after emplacement and allowed to set before the annular seal is put in place. The annular seal will consist of a cement bentonite grout. The annular seal will be placed from above the bentonite pellets to the base of the surface completion (approximately 3 feet bgs). The filter pack, transition seal, and annular seal will be emplaced through the hollow-stem auger, which will act as a tremie pipe. The surface completion will be installed above the annular seal and will consist of a concrete pad and a traffic-rated well box or a standpipe. The flush to the ground surface completions will be completed with a 12-inch-diameter, watertight, steel vault installed flush with the ground surface and secured in a 3-foot-square concrete pad sloped to divert surface drainage. The above ground surface completions will be completed with a well apron extending two feet in all directions from the protective casing. The well apron will be at least 4-inches thick and slope away from the casing



to drain surface water radially away from the protective casing and to prevent leakage down the outer wall of the protective casing. A locking well cap will be installed in the PVC casing for security. After each well is installed, the horizontal and vertical coordinates will be surveyed by a California-licensed surveyor.

The proposed locations of the two monitoring wells are presented in Figure 3. These monitoring wells will be screened in the most permeable zone in the A-aquifer, generally between 5 and 20 feet bgs. Figure 4 shows a representation of a typical monitoring well construction. A soil boring/monitoring well installation log is included in Appendix A. All applicable information regarding the well installations will be recorded by Trevet's on-site geologist.

### **3.4.2 Replacement Monitoring Well Installation**

Trevet will install 10 replacement groundwater monitoring wells at HPNS: IR01MW53BR, IR01MWI-7R, IR01MWI-9R, IR56MW39AR, PA36MW07AR, IR12MW14AR, IR12MW17AR, IR06MW54FR, IR06MW55FR, and IR06MW70FR (Table 1). These wells will be used to continue monitoring concentrations of COC in groundwater in accordance with their respective Records of Decisions and the current BGMP (Trevet 2017).

Two monitoring wells (IR01MWI-7 and IR01MW53BR) will be replacing the monitoring well being destroyed as described in Section 3.3; and the additional 8 will replace monitoring wells that have already been destroyed by on-site remedial or construction activities.

The replacement monitoring wells will be advanced using either a HSA or sonic drilling rig and will be constructed similar to wells they are replacing (Table 2) with the following exception:

- Monitoring wells IR06MW54FR and IR06MW55FR well construction will accommodate the elevation changes made during construction of the Hunters Point Artists Project (Geosyntec 2016). However, the depth of the screen intervals in the new wells, relative to mean seal level, will be similar to the previous wells.

The drilling methods described in Section 3.4.1 will be used.

The previous well locations are shown in Figure 3. The replacement monitoring wells will be located approximately 10 feet from the original monitoring well with the exception of monitoring well IR06MW54FR and IR06MW55FR which will be located as identified in the *Final Restricted Activities Work Plan, Hunters Point Artists Parcel Project, Navy Parcels B-1, C, and UC-2* report due to construction activities in the area (Geosyntec 2016). A licensed land surveyor or a global positioning system unit will be used to mark the locations of the replacement monitoring wells. A geophysical crew will clear each borehole location for utilities and attempted to locate the original monitoring wells. If any original monitoring wells are located, they will be properly destroyed as described in Section 3.3.

The original boring logs for these wells are included in Appendix B. Figure 4 shows a representation of a typical monitoring well construction. A soil boring/ monitoring well installation log is included in Appendix A. All applicable information regarding the well installations will be recorded by Trevet's on-site geologist.

### **3.4.3 Well Development**

Wells will be developed a minimum of 24 hours after construction. Development will begin by removing accumulated sand-size sediment in the well by bailing. Bailing will continue until the water is free of sand-sized particles.

Next, fine sediment will be removed from the wells screen and filter pack with a surge block made of an inert material. The water in the well will be forced through the well screen and filter pack by quickly moving the surge block up and down within the screened interval for several minutes. Sediment loosened by surging will be removed from the well by inserting a pump in the bottom of the well. The pump will be moved up and down through the screened interval as necessary. Pumping will continue until the water is visibly free from sediment and monitored groundwater parameters (temperature, pH, conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity) stabilize, until the well goes dry, or until approximately three to five casing volumes have been purged.

If water has been added during drilling, then the volume of water added will be removed during development. It is anticipated that development will require approximately 3 hours per well. After development, the well will be allowed to re-stabilize for at least 72 hours prior to sampling.

## **3.5 Monitoring Well Rehabilitation and Repairs**

Trevet will rehabilitate two monitoring wells (IR01MW366B and IR06MW56F) that have been affected during construction activities to remove all the solids and silts that have infiltrated the well. Well rehabilitation procedures will follow the guidelines outlined in Section 3.4.3.

Trevet will also replace well boxes or mounts at 13 existing monitoring wells at HPNS: IR01MW366B, PA28MW50A, IR04MW37A, IR04MW39A, IR72MW32A, IR55MW02A, IR50MW15A, IR36MW11A, IR17MW11A, IR36MW135A, IR01MW60A, IR70MW04A, and IR74MW01A (Table 1). These wells were identified to have substantially deficient surface completions or well vaults at the site. The well boxes or mounts of these 13 wells will be demolished, and new ones will be installed by a California licensed drilling subcontractor under Trevet supervision. Stainless steel identification tags will be affixed to the monitoring wells after repair. If necessary, the horizontal and vertical coordinates of the repaired wells will be surveyed by a California licensed land surveyor.

The locations of the two monitoring wells to be rehabilitated and the 13 monitoring wells where the well boxes or mounts will be replaced are presented in Figure 3. Well development records and photo documentation of well box repairs will be included in the well installation and destruction report.

Soil and well material IDW generated during these activities will be stored in roll-off bins. Purge and decontamination water will be containerized in a trailer-mounted tank and stored in the designated IDW staging area. The IDW will be characterized, profiled, transported, and disposed of as described in Section 4.

## Section 4 Waste Management Procedures

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The waste generated during this project will be appropriately stored, profiled, and disposed of off-site in accordance with federal, state, and local laws, regulations, and instructions. The Navy will be the generator and will sign any required manifests. All waste will be stored on site in U.S. Department of Transportation (DOT)-approved 55-gallon drums and soil bins.

### 4.1 Soil

Soil generated during drilling will be sampled and characterized before disposal. The sampling procedure will follow the guidelines presented in the U.S. Environmental Protection Agency (U.S. EPA) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (U.S. EPA 2015).

One soil sample per roll-off bin will be collected from a random location within the bin. A hand auger will be used to advance each sample location; no samples will be collected at depths of less than 1 foot below the soil surface to minimize potential VOC losses caused by volatilization. A soil sample from each bin will be collected using three Encore samplers for VOC analysis, three Encore Samplers for total petroleum hydrocarbon (TPH) as gasoline analysis, and an 8-ounce glass jar for the remainder of the analyses

Soil samples will be analyzed for the following constituents by EMAX Laboratories, Inc., using Total Threshold Limit Concentration and Soluble Threshold Limit Concentration leaching procedures, as applicable:

- VOCs using U.S. EPA Method 8260B
- Total petroleum hydrocarbons as gasoline, diesel, and motor oil using U.S. EPA Method 8015B modified
- CAM 17 Metals and mercury using U.S. EPA Method 6010B/7471A
- Polychlorinated biphenyl by U.S. EPA Method 8082 Polycyclic aromatic hydrocarbon by U.S. EPA Method 8310
- pH using U.S. EPA Method 9045D

The hand auger will be decontaminated before each sample is collected.

Soil from the bins will be classified for transport and disposal based on its waste characteristics. Soil will be transported under manifest by a licensed waste hauler to an appropriately licensed disposal facility within 90 days of generation in compliance with the CERCLA Off-Site Rule. Appropriate Navy personnel will sign the profile and manifests for all regulated materials leaving the site.

## **4.2 Construction Waste**

Construction-type waste generated during well destruction and repair will generally include concrete (such as well surface seals), well pipe, well vaults, and used plastic sheeting. These materials will be segregated from soil IDW and will be stored in a separate roll-off bin. These materials are inert and will be disposed of as common construction waste at a Class III landfill.

## **4.3 Decontamination and Development Water**

All decontamination and development water will be temporarily stored in a 500-gallon portable tank and DOT-approved 55-gallon drums in the IDW storage area and will be periodically discharged to the municipal sanitary sewer system under Trevet's San Francisco Public Utilities Commission wastewater discharge permit.

When well installation and decommissioning activities are completed one water sample will be collected and profiled. The water sample will be analyzed for the analytical requirements of the San Francisco Public Utility Commission discharge permit (SFPUC 2018). For IDW generated in a radiologically controlled area Trevet will coordinate with the Navy and the Navy's radiological contractor regarding requirements for radiological screening before disposal. Chemical analytical results will be submitted to the San Francisco Public Utilities Commission for review in accordance with an application for a local batch wastewater discharge permit. Wastewater that meets the sanitary district's criteria will be discharged to an onsite sanitary sewer inlet. Wastewater that exceeds the discharge permit criteria will be disposed of at a permitted disposal facility. Solids accumulating in the purge tank, if any, will be drummed, sampled, and disposed of in accordance with proper disposal requirement.

## **Section 5    Reporting**

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Trevet will prepare a report summarizing the monitoring well installation, destruction, rehabilitation, and repair completed at HPNS. This report will present a narrative summary of the work, map illustrating the wells that were destroyed and installed, well destruction logs, well installation logs, and updated survey data.

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## **Section 6 Project Management Plan**

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This section presents the management structure for the monitoring well installation, destruction, rehabilitation, and repair work at HPNS as described in this Work Plan. The following subsections present project organization and key personnel, subcontract support services, and the project schedule/ deliverable commitment.

### **6.1 Project Organization and Key Personnel**

The project team consists of Trevet's Project Manager (PM), Project Geologist, Site Health and Safety Officer, and Quality Assurance Coordinator. The Trevet PM, Erin Hunter, will have overall responsibility for all aspects of the project and for communications between Trevet and the Navy.

Day-to-day operations and subcontractor oversight is the responsibility of the Project Geologist who will report to the PM on a regular basis. The Project Geologist will also function as the Site Health and Safety Officer, with responsibility for oversight and review of all site-specific Health and Safety Plans, and plan implementation and policy conformance by all field personnel and subcontractors at the site.

Technical review will be conducted by an in-house senior staff member to assure that all documents are reviewed and are internally consistent prior to submittal to the Navy.

The Quality Assurance Coordinator, Gerald Tamashiro (Trevet), is responsible for all contractual quality assurance (QA) requirements as well as in-house QA requirements for project deliverables and subcontractor work products.

### **6.2 Subcontractors**

A State of California certified drilling subcontractor will perform the monitoring well installation, destruction, rehabilitation, and repair work. Soil cuttings and decontamination water analyses will require services from a subcontracted laboratory. EMAX in Torrance, California has been retained to provide the analytical services. EMAX is a California-accredited and Naval Facilities Engineering Service Center (NFESC)-approved laboratory.

### **6.3 Project Schedule**

The proposed schedule for completing the tasks identified in this Work Plan has been developed based on the period of performance for this contract. The Project Schedule is presented as Figure 5.



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## Section 7    **References**

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- DWR (California Department of Water Resources). 1981. *Water Well Standards: State of California*. Bulletin 74-81. December
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- Geosyntec 2016. *Final Restricted Activities Work Plan, Hunters Point Artists Parcel Project, Navy Parcels B-1, C, and UC-2, Hunters Point Naval Shipyard, San Francisco, California*. April.
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- Trevet. 2016. *Accident and Prevention Plan, Basewide Groundwater Monitoring Program, Hunters Point Naval Shipyard, Former Hunters Point Naval Shipyard, San Francisco, California*. November
- \_\_\_\_\_. 2017. *Final Management and Monitoring Approach Sampling and Analysis Plan for Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California*. April.
- U.S. EPA. (U.S. Environmental Protection Agency). 2015. SW-846. *Test Methods for Evaluation Solid Waste, Physical/Chemical Methods, Update IV*. August.

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## **Figures**

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**Figure 1. Site Vicinity Map**

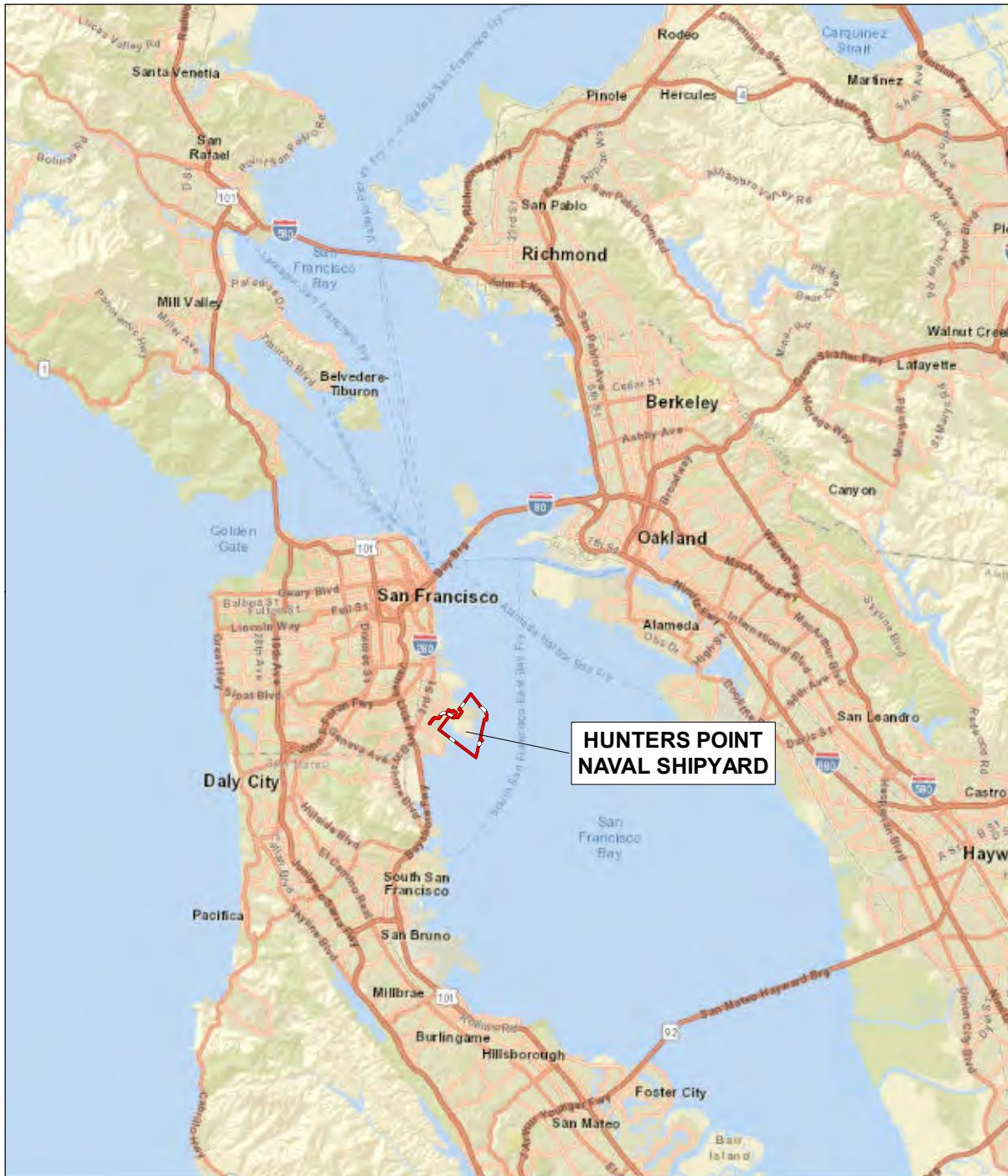
**Figure 2. Parcel Location Map**

**Figure 3. Monitoring Wells to be Installed, Destructed, Rehabilitated, or Repaired**

**Figure 4. Typical Monitoring Well Construction**

**Figure 5. Project Schedule**

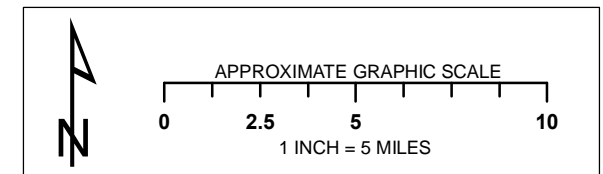
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### LEGEND

 Boundary of Hunters Point Naval Shipyard

SOURCE: ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA SPATIAL FEATURE CLASSES



DEPARTMENT OF THE NAVY  
**NAVAL FACILITIES  
ENGINEERING COMMAND**

SAN DIEGO, CALIFORNIA  
**NAVFAC**  
Naval Facilities Engineering Command  
NAVFAC SAN DIEGO

WELL INSTALLATION, DESTRUCTION, REHABILITATION,  
AND REPAIR WORK PLAN  
HUNTERS POINT NAVAL SHIPYARD  
SAN FRANCISCO, CALIFORNIA

## FIGURE 1 SITE VICINITY MAP

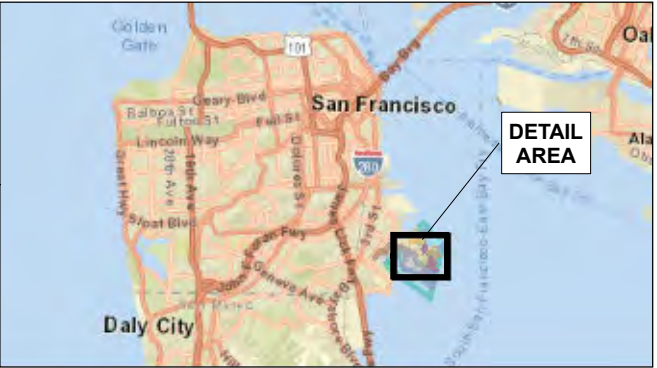
CONTRACT NO.: N62473-16-C-2004

DATE: NOVEMBER 2018

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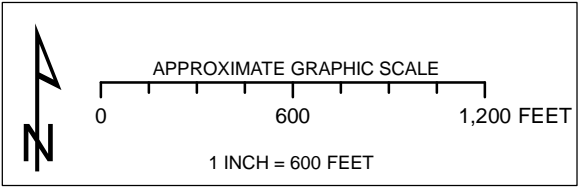


Date: 11/27/2018 Path: N:\GIS\_Projects\HuntersPoint\Figs\_WalDest\_11-18\Fig2\_AllParcels\_11-18.mxd



**LEGEND**

Parcels			
	B-1		F (Pier)
	B-2		F (Water)
	C		G
	D-1		IR 07/18
	D-2		UC-1
	E		UC-2
	E-2		UC-3
	Non - Navy property		
	San Francisco Bay		



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**FIGURE 2**

PARCEL LOCATION MAP

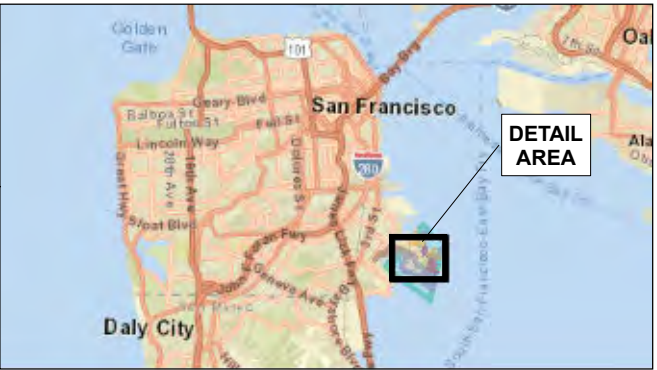
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DATE: NOVEMBER 2018



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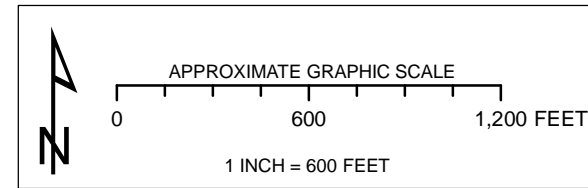
**LEGEND**

**Monitoring Well WorkStatus 2018**

- NEW MONITORING WELL TO BE INSTALLED
- MONITORING WELL TO BE REHABILITATED
- MONITORING WELL TO BE DECOMMISSIONED AND REPLACED
- MONITORING WELL TO BE REHABILITATED AND WELL BOX TO BE REPLACED
- MONITORING WELL TO BE REPLACED
- MONITORING WELL BOX TO BE REPLACED

**Parcels**

- |  |           |
|--|-----------|
| B-1                                      | F (Pier)  |
| B-2                                      | F (Water) |
| C  | G         |
| D-1                                      | IR 07/18  |
| D-2                                      | UC-1      |
| E  | UC-2      |
| E-2                                      | UC-3      |
| Non - Navy property                      |           |
| San Francisco Bay                        |           |
| Investigation derived waste storage area |           |



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HUNTERS POINT NAVAL SHIPYARD  
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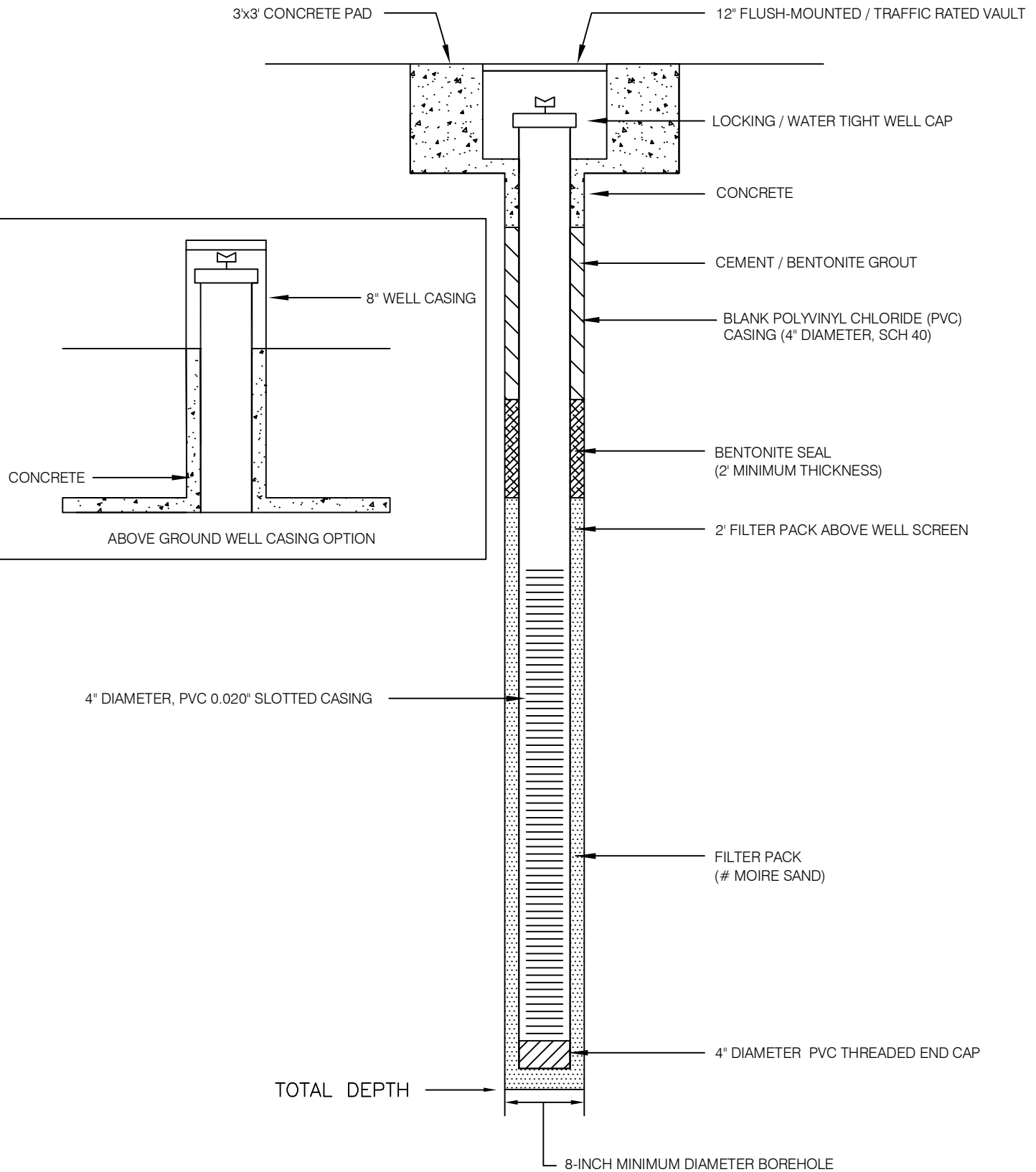
**FIGURE 3**

MONITORING WELLS TO BE INSTALLED,  
DESTRUCTION, REHABILITATED, OR REPAIRED

CONTRACT NO.: N62473-16-C-2004

DATE: NOVEMBER 2018

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 NAVFAC 300TH DISTRICT

HUNTERS POINT NAVAL SHIPYARD  
 SAN FRANCISCO, CALIFORNIA

CONTRACT NO.: N62473-16-C-2004

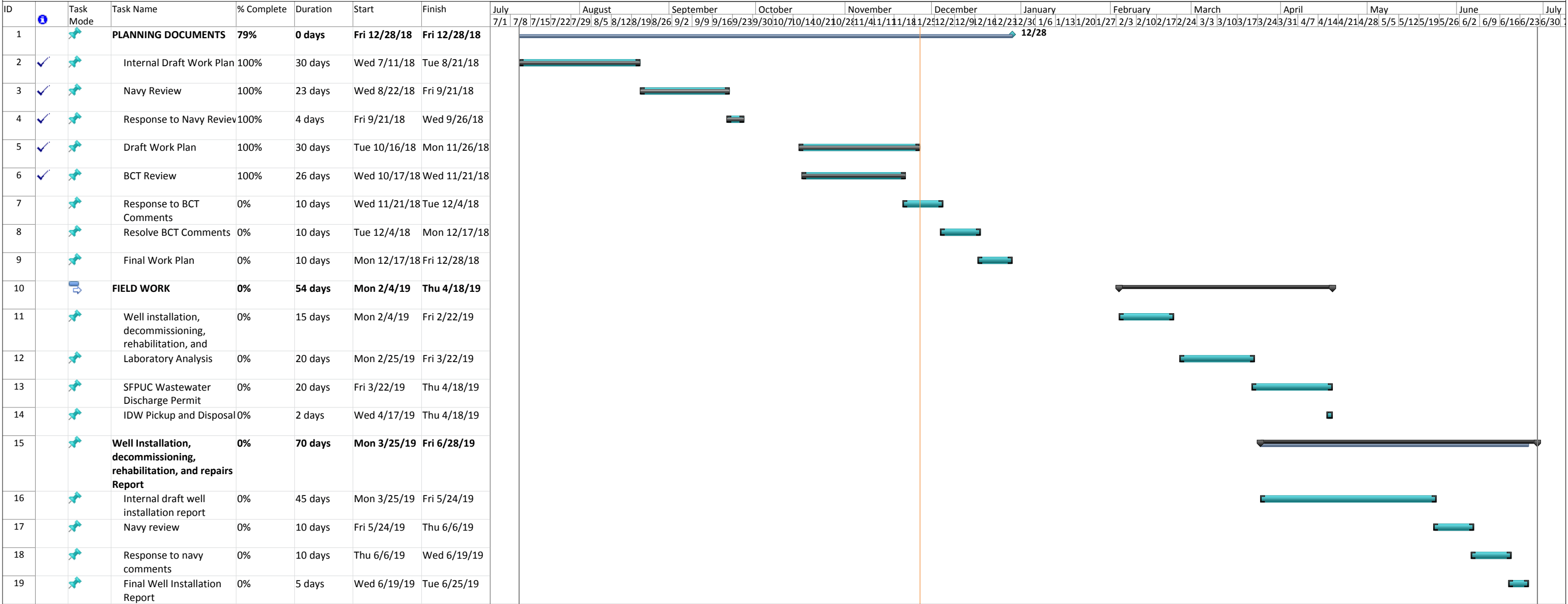
DATE: AUGUST 2018

**FIGURE 4**  
**TYPICAL MONITORING WELL CONSTRUCTION**

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Figure 5  
Project Schedule  
Well Installation, Destruction, Rehabilitation and Repair Work Plan  
Hunters Point Naval Shipyard, San Francisco, California



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## **Tables**

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**Table 1. Monitoring Well Installation, Destruction, Rehabilitation, and Repair List**

**Table 2. Monitoring Well Construction Details**



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TABLE 1  
Monitoring Well Installation, Decommission, Rehabilitation, and Repair List  
Hunters Point Naval Shipyard, San Francisco, California

Well ID	Parcel	Work Element(s)	Comment
IR01MW53B	E-2	Destruction/Installation	Integrity of the well has been compromised; the existing monitoring well should be destroyed and then replaced
IR01MWI-7	E-2	Destruction/Installation	Integrity of the well has been compromised; the existing monitoring well should be destroyed and then replaced
IR28MW276A	C	Installation	Monitoring well to support remedial investigation in RU-C4
IR28MW277A	C	Installation	Monitoring well to support remedial investigation in RU-C4
IR06MW56F	UC-2	Rehabilitation	Mud and solids have accumulated in IR06MW56F due to construction activities in this parcel. Dedicated equipment is covered in thick mud and had to be removed.
IR01MW366B	E-2	Rehabilitation/ Well Box Replacement	Mud and solids have accumulated in IR01MW366B due to construction activities in this parcel. Well mount also needs to be replaced
IR06MW70F	C	Replace	Monitoring Well was added to the BGMP to delineate a plume in RU-C5; unable to locate for two events. Replace monitoring well to fill data gap
IR12MW14A	E	Replace	Unable to locate after three events; replace monitoring well to be consistent with the BGMP for Parcel E
IR12MW17A	E	Replace	Unable to locate after three events; replace monitoring well to be consistent with the BGMP for Parcel E
IR56MW39A	E	Replace	Unable to locate after three events; replace monitoring well to be consistent with the BGMP for Parcel E
PA36MW07A	E	Replace	Unable to locate after three events; replace monitoring well to be consistent with the BGMP for Parcel E
IR01MWI-9	E-2	Replace	Monitoring Well was inadvertently destroyed; casing was found in a debris pile. Monitoring well should be replaced
IR06MW54F	UC-2	Replace	Monitoring Well was decommissioned due to construction activities in UC-2. Replace monitoring well now construction activities are complete
IR06MW55F	UC-2	Replace	Monitoring Well was decommissioned due to construction activities in UC-2. Replace monitoring well now construction activities are complete
IR01MW60A	E-2	Well Box Repair	Casing too tall for mount; replace mount to properly fit or cut and get re-surveyed
PA28MW50A	C	Well Box Replacement	Replace well box; recommends installing a mount since this building floods in the area this well is located
IR17MW11A	D-1	Well Box Replacement	Replace well box
IR50MW15A	D-1	Well Box Replacement	Replace well box
IR55MW02A	D-1	Well Box Replacement	Replace well box
IR70MW04A	D-1	Well Box Replacement	Replace well box
IR04MW37A	E	Well Box Replacement	Replace well box
IR04MW39A	E	Well Box Replacement	Replace well box
IR36MW11A	E	Well Box Replacement	Replace well box
IR36MW135A	E	Well Box Replacement	Replace well box
IR72MW32A	E	Well Box Replacement	Replace well box
IR74MW01A	UC-3	Well Box Replacement	Replace well box

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Table 2  
Existing Monitoring Well Construction Details  
Hunters Point Naval Shipyard, San Francisco, California

Well ID	Parcel	Installation Date	Construction Details	Boring Diameter (inches)	Casing Diameter (inches)	Top of Screen (ft BTOC)	Bottom of Screen (ft BTOC)	Screen Length (ft)	Well Depth (ft BTOC)	Boring Depth	Top of Sandpack (ft BTOC)	Top of Bentonite Seal (ft BTOC)	Top of Grout Seal (ft BTOC)	Top of Casing (ft MSL)	Ground Surface (ft MSL)	Easting (NAD83)	Northing (NAD83)
IR01MW366B	E-2	6/25/2004	Sch-40 PVC 0.020 Slotsize	10	4	43	53	10	55	55	42	36	2	16.7	NA	6019625.726	2091416.716
IR01MW53B	E-2	4/11/1991	Sch-40 PVC 0.020 Slotsize	10	4	34	44	10	44	46	33	30	0	10	8.78	6018146.189	2091541.08
IR01MWI-7	E-2	9/16/1986	Stainless Steel 0.010 Slotsize	8	2	3	13	10	13	13	2	1	0	5.81	NA	6018178.148	2091415.522
IR01MWI-9	E-2	9/30/1986	Stainless Steel 0.010 Slotsize	8	2	3	13	10	13	16.5	2	1	0	8	7.34	6019015.962	2091392.516
IR56MW39A	E	10/26/1994	Sch-40 PVC 0.020 Slotsize	10	4	6	21	15	21.5	22	4	2	0.5	9	10.36	6022108.97	2090480.287
PA36MW07A	E	2/8/1993	Sch-40 PVC 0.020 Slotsize	10	4	5	20	15	20	22	3.5	2	1	7	7.37	6022564.954	2093213.553
IR12MW14A	E	6/24/1991	Sch-40 PVC 0.020 Slotsize	11	4	5	20	15	20	21	4	2.5	1	9	9.72	6019887.351	2091295.299
IR12MW17A	E	8/11/1992	Sch-40 PVC 0.020 Slotsize	8	4	5	15	10	15	16	4	2	0	12	10.8	6022611.353	2089429.056
IR06MW70F	C	12/17/2013	Sch-40 PVC 0.010 Slotsize	10	4	17	25	8	25	25	15	13	0	12	12.33	6019798.174	2091002.454
IR06MW54F	UC-2	12/9/1993	Sch-40 PVC 0.020 Slotsize	10	4	42	52	10	52.5	53	40	38	0.5	35.02	35.86	6022300.606	2093168.928
IR06MW55F	UC-2	12/9/1993	Sch-40 PVC 0.020 Slotsize	10	4	36	46	10	46.5	46.5	32.5	30.5	0.5	32.34	32.94	6022466.712	2093157.97
IR06MW56F	UC-2	12/10/1993	Sch-40 PVC 0.020 Slotsize	10	4	33.5	43.5	10	44	44	32.5	29.5	0.5	25	26.03	6020175.552	2091805.225
PA28MW50A	C	2/18/1993	Sch-40 PVC 0.020 Slotsize	10	4	5	20	15	20	20.5	4	3	1	8.6	9.08	6020073.959	2092149.234
IR04MW39A	E	11/19/1990	Sch-40 PVC 0.020 Slotsize	12	4	5	25	20	25	25	4	3	1	7.86	8.82	6022639.65	2093144.326
IR04MW37A	E	11/20/1990	Sch-40 PVC 0.020 Slotsize	12	4	7.5	22.5	15	22.5	23	5	4	1	9.5	10.2	6020268.231	2091680.638
IR72MW32A	E	10/10/1995	Sch-40 PVC 0.010 Slotsize	10	4	6	21	15	21.5	21.5	4	2	0	10.08	10.74	6020693.356	2090864.726
IR55MW02A	D-1	1/4/1900	Sch-40 PVC 0.020 Slotsize	10	4	8	21	13	21.5	22	4	2	0.5	7.27	7.77	6022511.544	2089704.915
IR50MW15A	D-1	6/3/1994	Sch-40 PVC 0.020 Slotsize	10.25	4	5	20	15	20	21	4	3	0.25	6.6	6.96	6020266.5	2091854.392
IR36MW11A	E	8/30/1994	Sch-40 PVC 0.020 Slotsize	10	4	6	21	15	21.5	22.5	4	2	0.5	8.54	9	6020311.728	2090442.248
IR17MW11A	D-1	7/17/1991	Sch-40 PVC 0.020 Slotsize	11	4	4	17	13	17	17.5	3	2	0.5	7.85	8.56	6020352.097	2090594.764
IR36MW135A	E	12/15/1995	Sch-40 PVC 0.010 Slotsize	10	4	6	26	20	26.5	26.5	4	2	0.5	7.84	8.37	6022621.002	2090247.563
IR01MW60A	E-2	12/18/1997	Sch-40 PVC 0.020 Slotsize	12	4	10	20	10	22	22	9	7	0.5	14.6	11.51	6018494.328	2091648.81
IR70MW04A	D-1	8/10/1995	Sch-40 PVC 0.020 Slotsize	10	4	6	21	15	21.5	21.5	4	2	0	7.32	7.69	6024285.064	2092843.921
IR74MW01A	UC-3	7/11/1996	Sch-40 PVC 0.010 Slotsize	10	4	10.5	15.5	5	16	19.5	8	6	0	13.16	13.88	6020122.829	2091888.223

Abbreviations:  
ftBTOC: feet below top of casing  
ftMSL: feet above mean sea level  
IR: Installation Restoration  
NA: information not available  
NNP: Non-Navy Property  
Easting and Northing projections in NAD83 CA State Plane III US ft

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## **Appendix A: Field Forms**

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Borehole Log

Well Construction Diagram

Well Destruction Diagram

Well Development Log

Groundwater Measurement Form

YSI calibration form

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## Borehole Log / Well Construction Diagram

<b>Project Name:</b>				<b>Project Number:</b>				<b>Borehole ID:</b>			
<b>Borehole Location:</b>				<i>Northing:</i>				<i>Easting:</i>			
				Sheet:      of							
<b>Drilling Company:</b>				<b>Driller(s):</b>							
<b>Drilling Equipment:</b>				<b>Date Started:</b>				<b>Total Depth:</b> feet			
<b>Drilling Method:</b>				<b>Date Finished:</b>				<b>Bedrock Depth:</b> feet			
<b>Drilling Fluid:</b>				<b>Depth to Groundwater During Drilling:</b> feet							
<b>Completion Information:</b>				<b>Static Depth to Groundwater:</b> feet							
				<b>Ground Elev.:</b> feet (amsl)				<b>TOC Elevation:</b> feet (amsl)			
				<b>Logged By:</b>				<b>Checked By:</b>			

Depth (feet)	Samples				Field Analyses			Log		Lithologic Description	Well Construction	Remarks
	Location	Number	Type	Time	PID Sample (ppm)	PID Breathing Zone (ppm)	Additional Tests	Graphic	USCS			
2												
4												
6												
8												
10												
12												
14												
16												
18												
20												
22												
24												





## Borehole Log / Well Construction Diagram

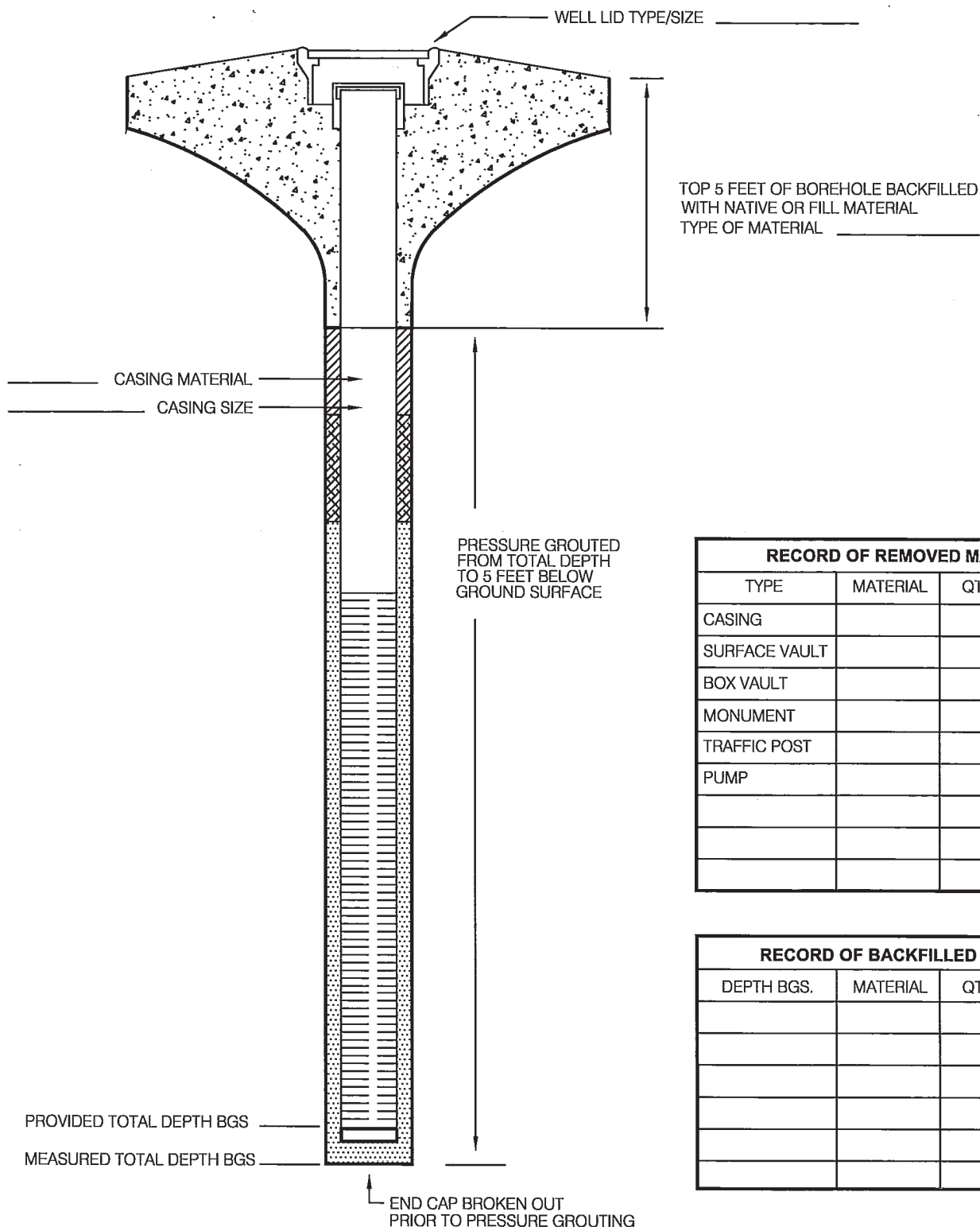
<b>Project Name:</b>					<b>Project Number:</b>					<b>Borehole ID:</b>		
										Sheet:      of		
Depth (feet)	Samples				Field Analyses			Log		Lithologic Description	Well Construction	Remarks
	Location	Number	Type	Time	PID Sample (ppm)	PID Breathing Zone (ppm)	Additional Tests	Graphic	USCS			
26  28  30  32  34  36  38  40  42  44  46  48  50  52  54												

T.D.	ACTUAL
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100	100

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MONITORING WELL ID \_\_\_\_\_  
 DRILLING COMPANY \_\_\_\_\_  
 LEAD DRILLER \_\_\_\_\_  
 RIG TYPE \_\_\_\_\_ CME # \_\_\_\_\_  
 AUGER SIZE \_\_\_\_\_

DESTRUCTION DATE \_\_\_\_\_  
 METHOD OF DESTRUCTION \_\_\_\_\_  
 TYPE OF WELL \_\_\_\_\_



RECORD OF REMOVED MATERIALS			
TYPE	MATERIAL	QTY	PLACEMENT
CASING			
SURFACE VAULT			
BOX VAULT			
MONUMENT			
TRAFFIC POST			
PUMP			

RECORD OF BACKFILLED MATERIAL			
DEPTH BGS.	MATERIAL	QTY	VOLUME

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DEPARTMENT OF THE NAVY  
**NAVFAC SOUTHWEST**



DATE: OCTOBER 2010  
 CONTRACT NO.: N62473-09-C-0607

WELL DESTRUCTION WORK PLAN  
 FORMER MARINE CORPS AIR STATION EL TORO  
 IRVINE, CALIFORNIA

**FIGURE X**  
**TYPICAL MONITORING WELL DESTRUCTION DIAGRAM**

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Well: _____	Project: _____	Development Method: _____	Pump Type: _____
Date: _____	Project No.: _____	Casing Diameter (in): _____	Static Depth to Water (ft): _____
	Personnel: _____	Boring Diameter (in): _____	Borehole Volume (gal): _____
	Subcontractor: _____	Installed Total Depth (ft): _____	Measured Total Depth (ft): _____ (initial)

Page \_\_\_\_ of \_\_\_\_

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**Field Personnel:** \_\_\_\_\_

[illegible]



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## YSI Field Calibration Form

Model # \_\_\_\_\_

Field staff: \_\_\_\_\_

S/N \_\_\_\_\_

Date rented or purchased: \_\_\_\_\_

Field Date

\_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_   
 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_   
 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_   
 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_   
 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_   
 \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Standard Value

**pH**4.00 Exp. Date \_\_\_\_\_

Initial	Initial	Initial	Initial	Initial	Initial
Final	Final	Final	Final	Final	Final

7.00 Exp. Date \_\_\_\_\_

Initial	Initial	Initial	Initial	Initial	Initial
Final	Final	Final	Final	Final	Final

10.00 Exp. Date \_\_\_\_\_

Initial	Initial	Initial	Initial	Initial	Initial
Final	Final	Final	Final	Final	Final

**Conductivity**

\_\_\_\_\_ Exp. Date \_\_\_\_\_

Initial	Initial	Initial	Initial	Initial	Initial
Final	Final	Final	Final	Final	Final

**ORP**

\_\_\_\_\_ Exp. Date \_\_\_\_\_

Initial	Initial	Initial	Initial	Initial	Initial
Final	Final	Final	Final	Final	Final

**DO**

\_\_\_\_\_ Exp. Date \_\_\_\_\_

Initial	Initial	Initial	Initial	Initial	Initial
Final	Final	Final	Final	Final	Final

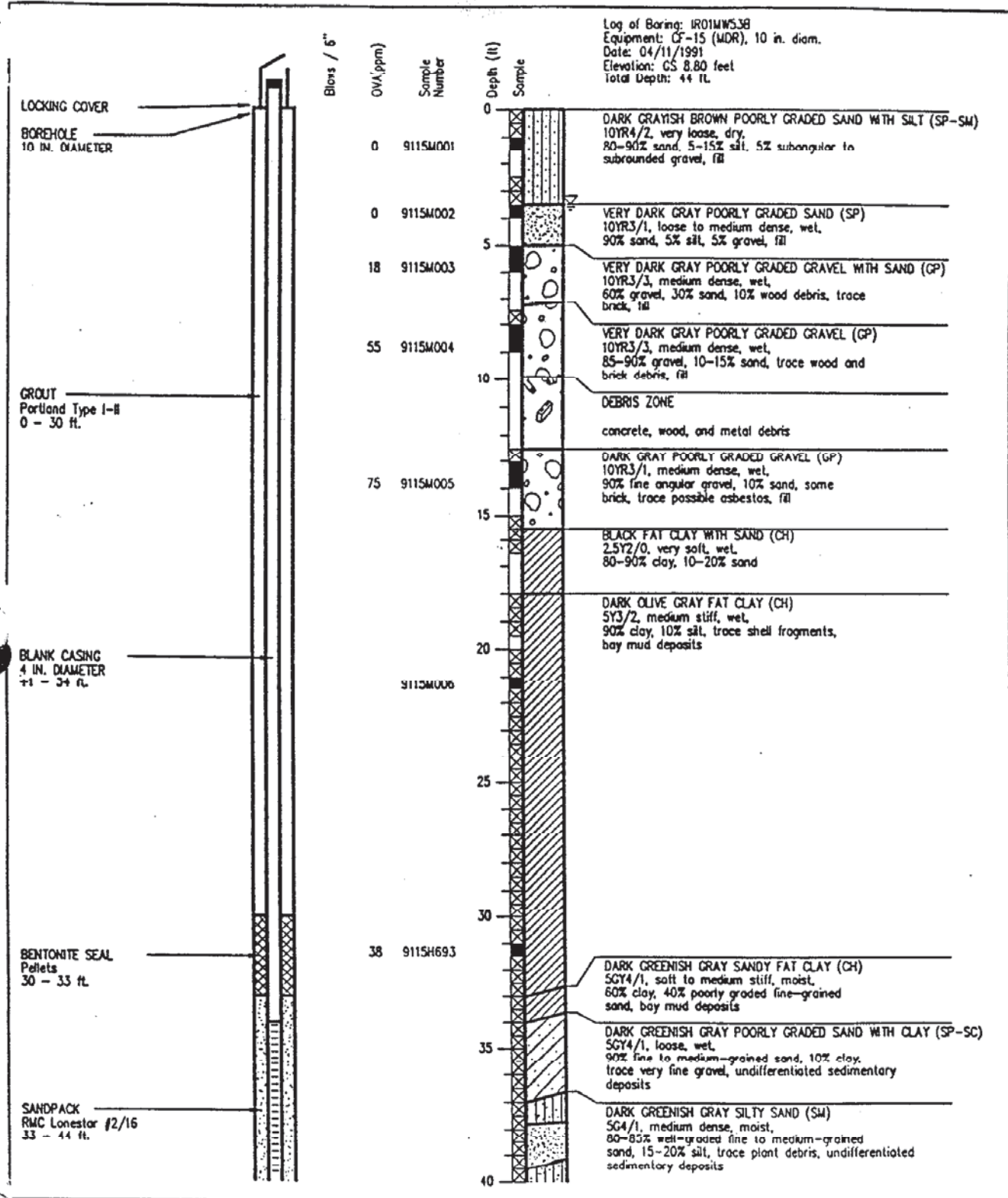
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## **Appendix B: Previous Boring Logs**

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Well ID: IR01MW53B



Harding Lawson Associates  
Engineering and  
Environmental Services

Log of Boring IR01MW53B with Well Completion Detail  
Naval Station Treasure Island  
Hunters Point Annex  
San Francisco, California

PLATE

DRAWN

JOB NUMBER

APPROVED

DATE  
12/93

REVISED DATE

SLOTTED SCREEN  
Schedule 40 PVC  
(0.02 IN. SLOTSIZE)  
34 - 44 ft

Blows / 6"

O/A (ppm)

Sample  
Number

Depth (ft)

Sample

0 9115H694

Log of Boring: IR01MWS3B (p. 2)  
Equipment: CF-15 (MDR), 10 in. diam.  
Date: 04/11/1991  
Elevation: GS 8.80 feet  
Total Depth: 44 ft.

(37.8 ft)  
LIGHT OLIVE BROWN POORLY GRADED SAND (SP)  
2.5YS/4, very loose, wet,  
95-100% fine- to medium-grained sand, 0-3%  
silt, undifferentiated sedimentary deposits

(39.5 ft)  
YELLOWISH BROWN SILTY SAND (SW)  
10YR5/6, medium dense to dense, moist,  
80-85% well-graded fine- to medium-grained  
sand, 15-20% silt, few to little iron oxide  
staining, undifferentiated sedimentary deposits

LIGHT OLIVE BROWN WELL-GRADED SAND WITH SILT (SW-SM)  
loose, wet,  
90% well-graded fine- to medium-grained sand,  
10% silt, some iron oxide mottling, undifferentiated  
sedimentary deposits

Bottom of boring at 44 feet.



Harding Lawson Associates  
Engineering and  
Environmental Services

Log of Boring IR01MWS3B with Well Completion Detail  
Naval Station Treasure Island  
Hunters Point Annex  
San Francisco, California

PLATE

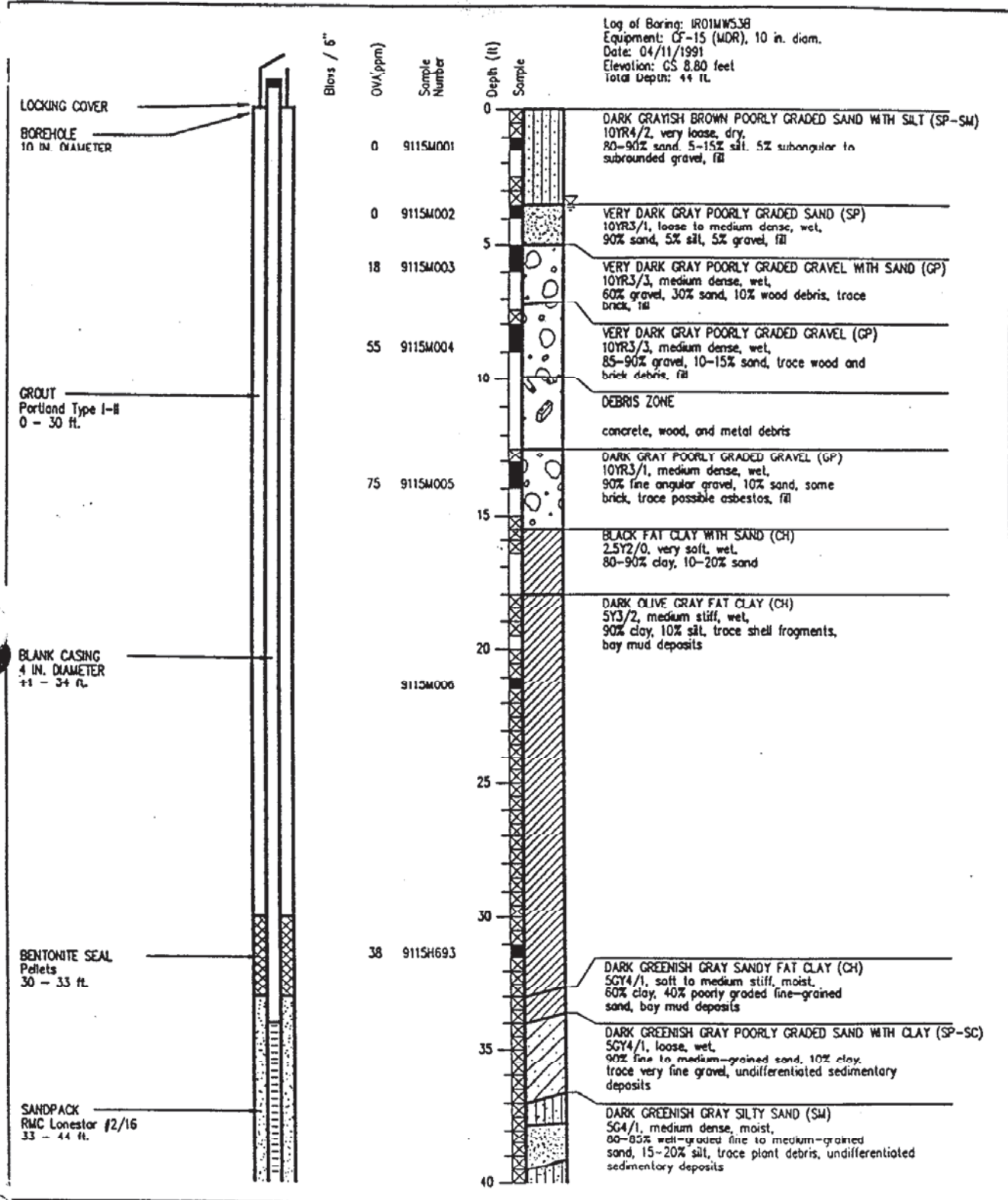
DRAWN

JOB NUMBER

APPROVED

DATE  
12/93

REVISED DATE



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 Engineering and  
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Log of Boring IR01MWS3B with Well Completion Detail  
 Naval Station Treasure Island  
 Hunters Point Annex  
 San Francisco, California

PLATE

DRAWN

JOB NUMBER

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DATE

REVISED DATE

12/93



SLOTTED SCREEN  
Schedule 40 PVC  
(0.02 IN. SLOTSIZE)  
34 - 44 ft

Bore / 6"

O/A (ppm)

Sample  
Number

Depth (ft)

Sample

0 9115H694

Log of Boring: IR01MWS38 (p. 2)  
Equipment: CF-15 (MDR), 10 in. diam.  
Date: 04/11/1991  
Elevation: GS 8.80 feet  
Total Depth: 44 ft.

(37.8 ft)  
LIGHT OLIVE BROWN POORLY GRADED SAND (SP)  
2.5YS/4, very loose, wet,  
05-100% fine- to medium-grained sand, 0-3%  
silt, undifferentiated sedimentary deposits

(39.5 ft)  
YELLOWISH BROWN SILTY SAND (SW)  
10YR5/6, medium dense to dense, moist,  
80-85% well-graded fine- to medium-grained  
sand, 15-20% silt, few to little iron oxide  
stains, undifferentiated sedimentary deposits

LIGHT OLIVE BROWN WELL-GRADED SAND WITH SILT (SW-SM)  
loose, wet,  
90% well-graded fine- to medium-grained sand,  
10% silt, some iron oxide mottling, undifferentiated  
sedimentary deposits

Bottom of boring at 44 feet.



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Log of Boring IR01MWS38 with Well Completion Detail  
Naval Station Treasure Island  
Hunters Point Annex  
San Francisco, California

PLATE

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DATE  
12/93

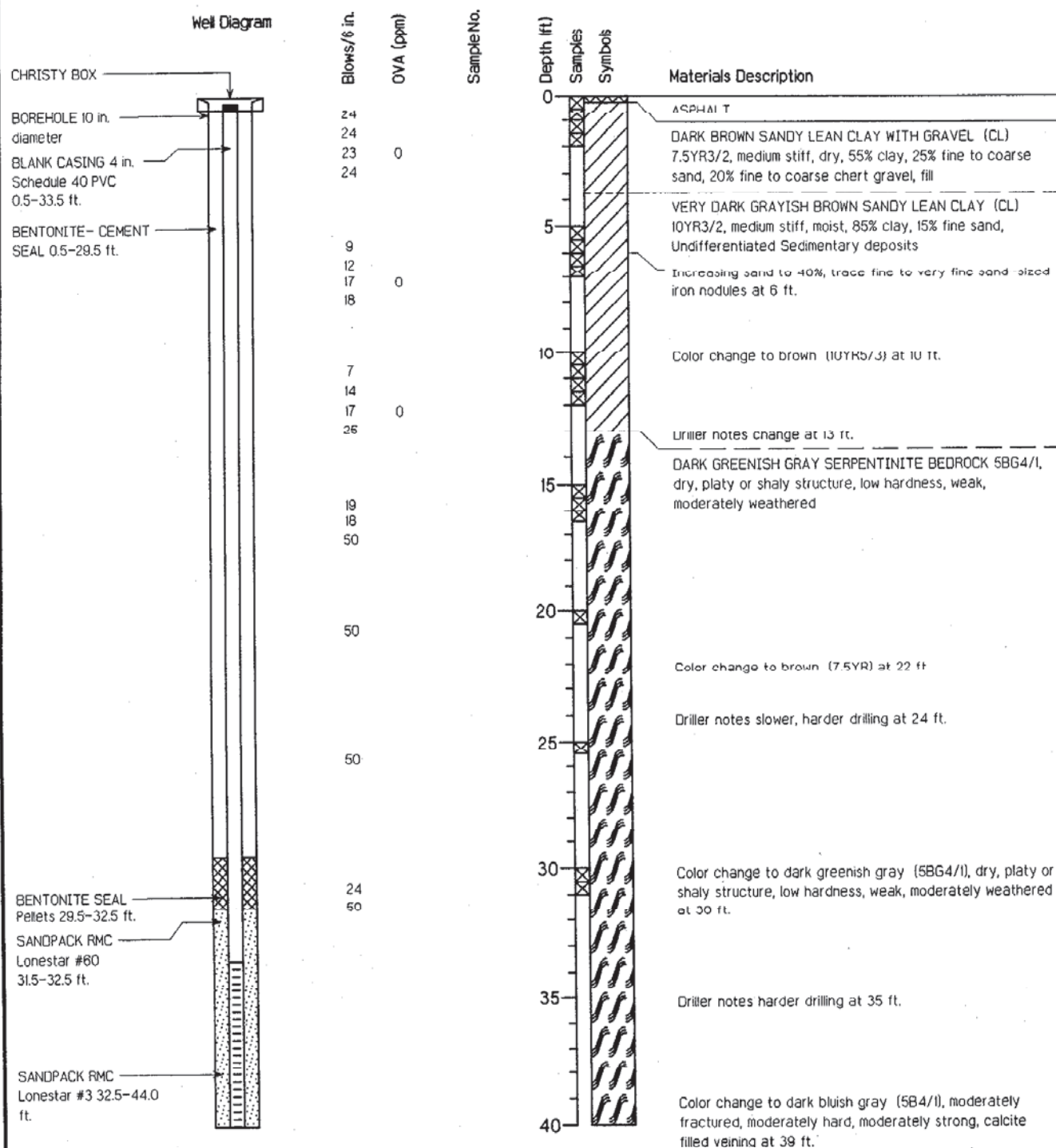
REVISED DATE

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**LOG OF BORING IR06MW56F**

Page 1 of 2



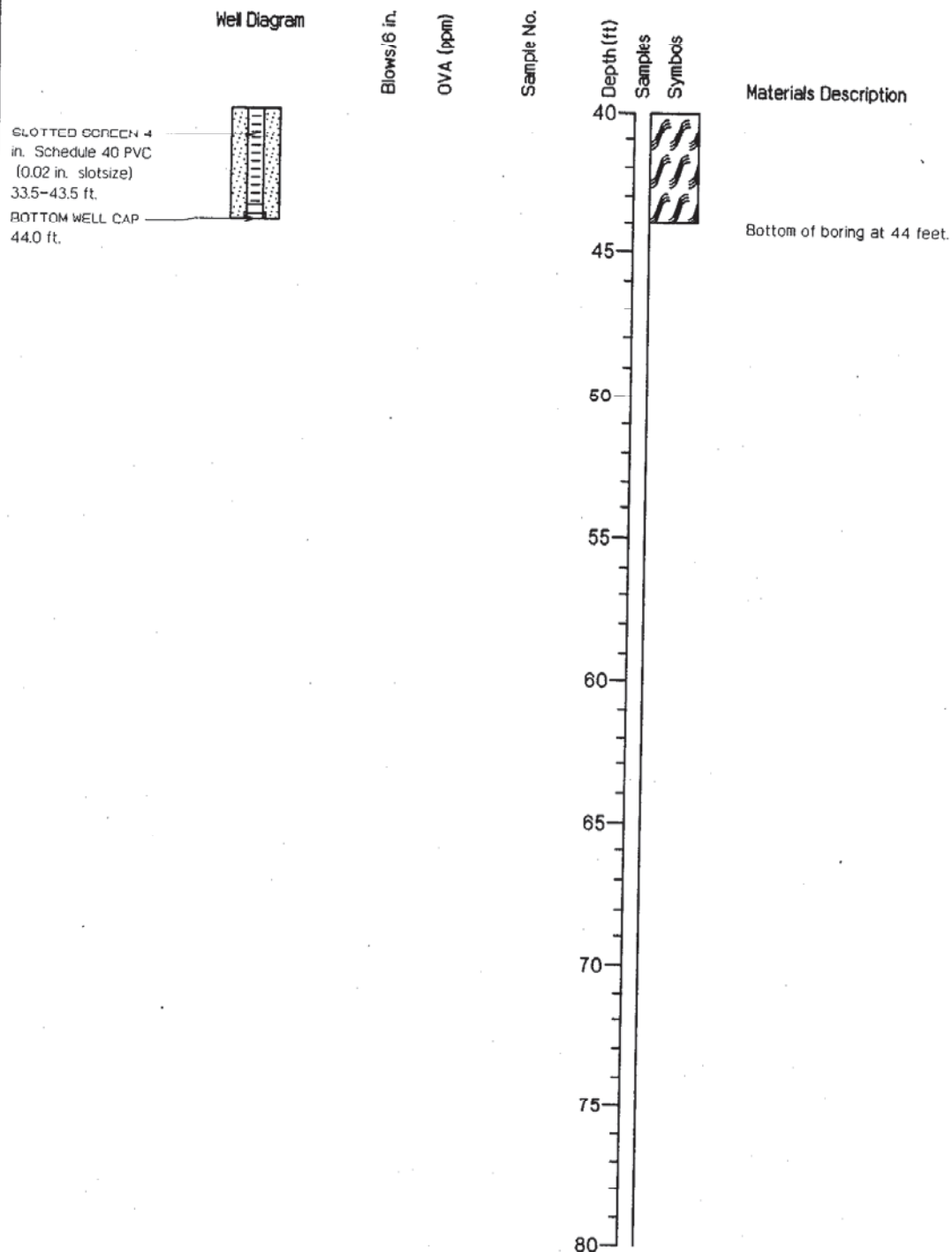
Project Number	11400 1402	Date Drilled	12/10/1993	Figure
Project Name	Parcel B RI Report	GS Elevation	26.03 ft.	
Project Task	Hunters Point Annex	Water Level	None Encountered	
Project Location	San Francisco, California	Total Depth Of Hole	44 ft.	
Equipment	Drill Systems 1000 (ACH), 10 in. diam.			

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**LOG OF BORING IR06MW56F**

Page 2 of 2



Project Number 11400 1402

Project Name Parcel B RI Report

Project Task Hunters Point Annex

Project Location San Francisco, California

Equipment Drill Systems 1000 (ACH), 10 in. diam.


Date Drilled 12/10/1993

GS Elevation 28.03 ft.



Water Level None Encountered

Total Depth Of Hole 44 ft.

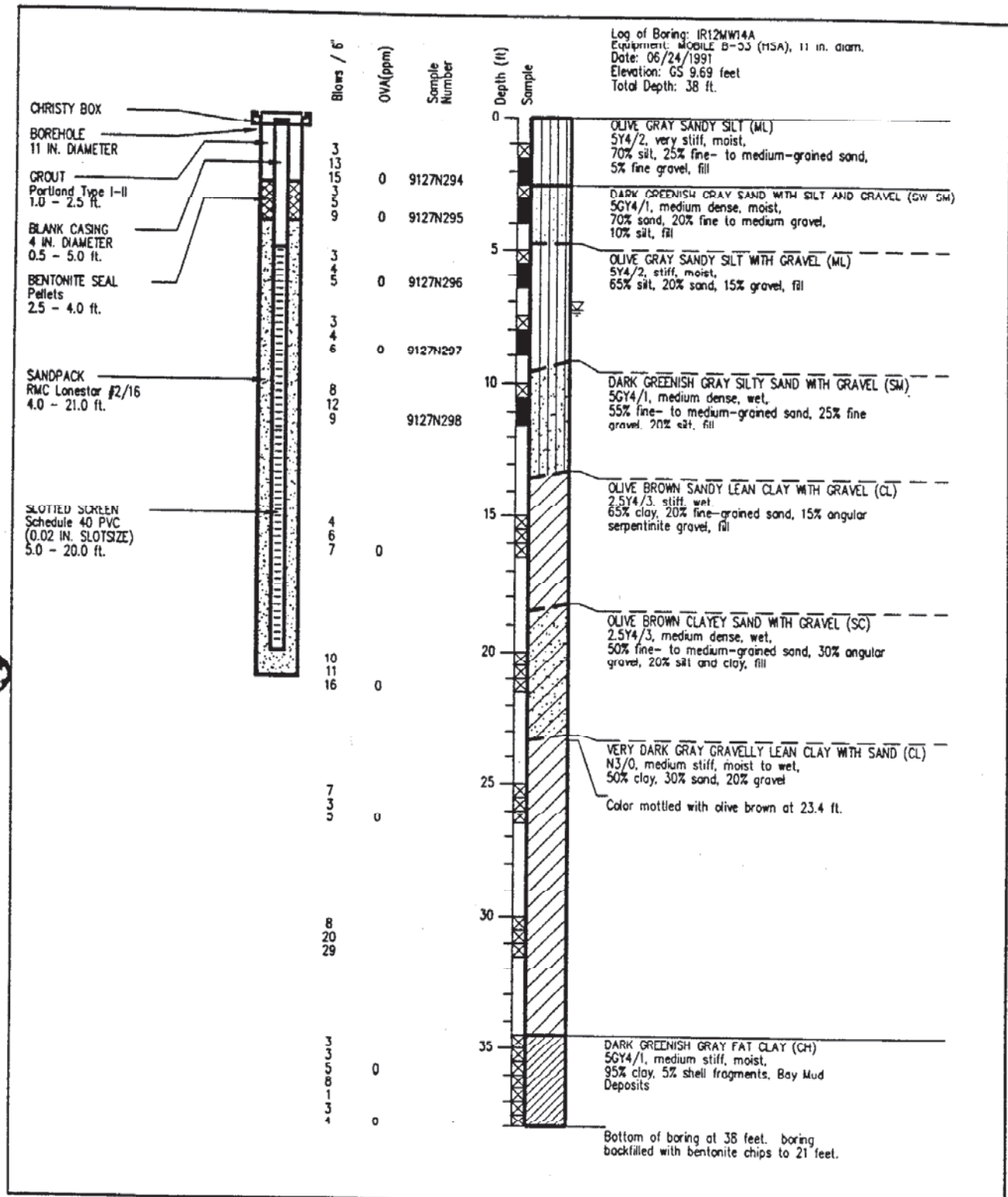
Figure

							Well NO. IR06MW70F	
PROJECT: Hunters Point, CTO-8		PROJECT NUMBER: 140368		FIELD GEOLOGIST: Michael Glas		COORDINATES (NAD 83): N. 2093200.929		
LOCATION: San Francisco, CA		DRILLING METHOD: Hollow Stem Auger		CHECKED BY:		E. 6022578.456		
DRILL CO.: Cascade		BOREHOLE DIAMETER: 10"		APPROVED BY:		TOC ELEV (NAVD 88): 12.033		
DRILLER: Mauricio Sanchez		SAMPLE METHOD: Cuttings		SLOT SIZE: 0.010"		GS ELEV (NAVD 88): 12.336		
SCREEN: Diameter: 4"		Length: 8' Type: Schedule 40 PVC		TOTAL DEPTH: 25'		DATE BEGAN: 12/16/13		
CASING: Diameter: 4"		Length: 17' Type: Schedule 40 PVC		FILTER PACK: #2/16 sand		DATE FINISHED: 12/17/2013		
DTW:								

Elevation (ft. amsl)	Depth (feet)	Well Completion	PID ppm	Soil Sample	USCS Symbol	Profile	Description	Comments
12.34	—0.0				ML		Silt, trace sand, olive gray (5Y4/2), dry, soft.	Highly weathered serpentinite bedrock?
11.84	—0.5							
11.34	—1.0							
10.84	—1.5							
10.34	—2.0							
9.84	—2.5							
9.34	—3.0							
8.84	—3.5							
8.34	—4.0							
7.84	—4.5							
7.34	—5.0							
6.84	—5.5							
6.34	—6.0							
5.84	—6.5							
5.34	—7.0							
4.84	—7.5							
4.34	—8.0							
3.84	—8.5							
3.34	—9.0							
2.84	—9.5							
2.34	—10.0							
1.84	—10.5							
1.34	—11.0							
0.84	—11.5							
0.34	—12.0							
-0.16	—12.5							
-0.66	—13.0							
-1.16	—13.5							
-1.66	—14.0							
-2.16	—14.5							
-2.66	—15.0							

<div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> <p><b>Well NO. IR06MW70F</b></p> <p>COORDINATES (NAD 83): N. 2093200.929 E. 6022578.456</p> <p>TOC ELEV (NAVD 88): 12.033 GS ELEV (NAVD 88): 12.336 DATE BEGAN: 12/16/13 DATE FINISHED: 12/17/2013</p> </div>						<p>PROJECT: Hunters Point, CTO-8      PROJECT NUMBER: 140368</p> <p>LOCATION: San Francisco, CA      DRILLING METHOD: Hollow Stem Auger      FIELD GEOLOGIST: Michael Glas</p> <p>DRILL CO.: Cascade      BOREHOLE DIAMETER: 10"      CHECKED BY:</p> <p>DRILLER: Mauricio Sanchez      SAMPLE METHOD: Cuttings      APPROVED BY:</p> <p>SCREEN: Diameter: 4"      Length: 8'      Type: Schedule 40 PVC      Slot Size: 0.010"</p> <p>CASING: Diameter: 4"      Length: 17"      Type: Schedule 40 PVC      TOTAL DEPTH: 25'</p> <p>DTW:      FILTER PACK: #2/16 sand</p>		
Elevation (ft. amsl)	Depth (feet)	Well Completion	PID ppm	Soil Sample	USCS Symbol	Profile	Description	Comments
-3.16	15.5				ML		Same as above.	
-3.66	16.0							
-4.16	16.5							
-4.66	17.0							
-5.16	17.5							
-5.66	18.0							
-6.16	18.5							
-6.66	19.0							
-7.16	19.5							
-7.66	20.0							
-8.16	20.5							
-8.66	21.0							
-9.16	21.5							
-9.66	22.0							
-10.16	22.5							
-10.66	23.0							
-11.16	23.5							
-11.66	24.0							
-12.16	24.5							
-12.66	25.0						TD=25'	Encountered refusal at 25'.
-13.16	25.5							
-13.66	26.0							
-14.16	26.5							
-14.66	27.0							
-15.16	27.5							
-15.66	28.0							
-16.16	28.5							
-16.66	29.0							
-17.16	29.5							
-17.66	30.0							



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# Log of Boring IR12MW14A with Well Completion Detail

Naval Station, Treasure Island  
 Hunters Point Annex  
 San Francisco, California

PLATE

DRAWN  
 WJF

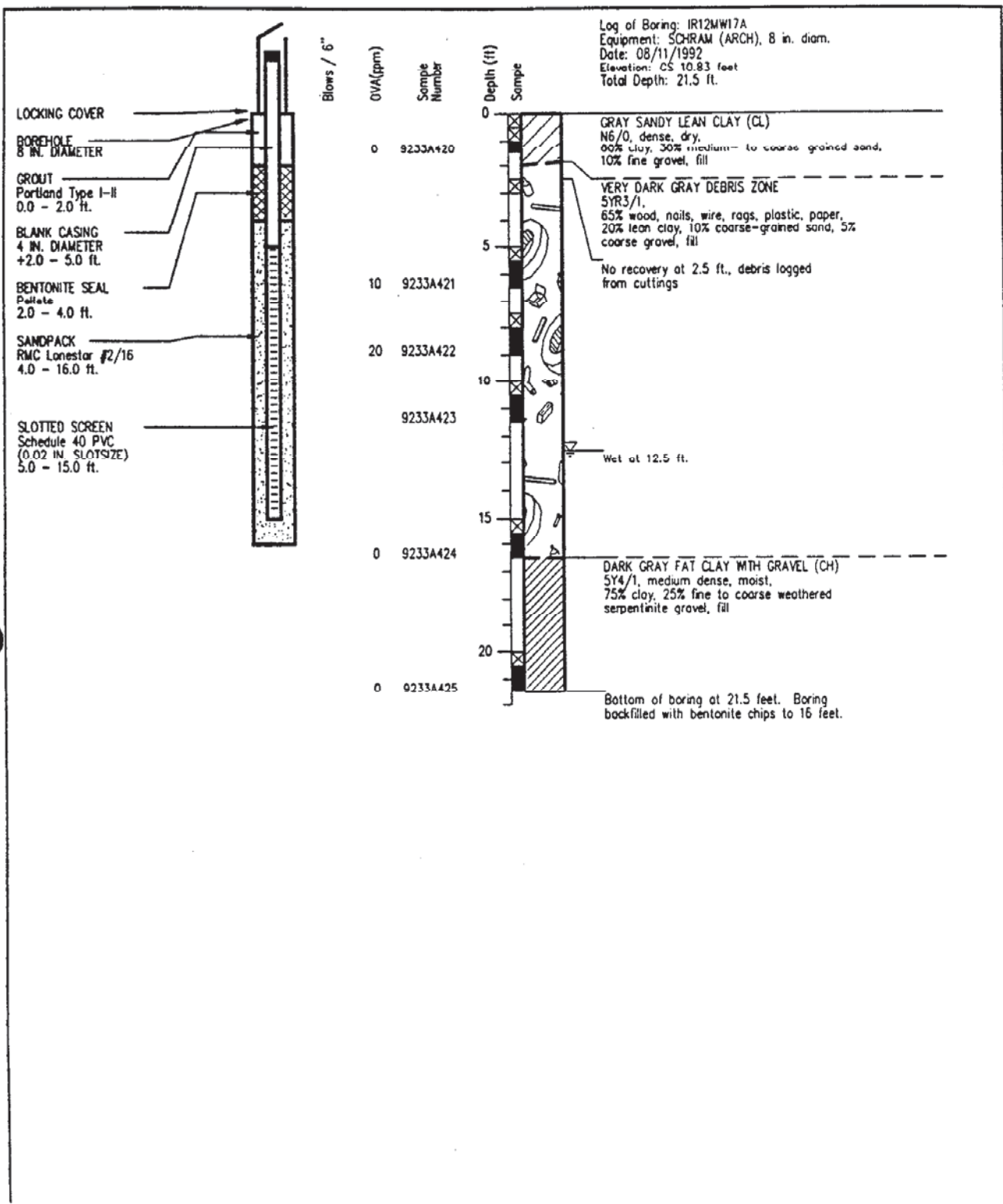
JOB NUMBER

APPROVED

DATE  
 10/92

REVISED DATE

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 Engineering and  
 Environmental Services

Log of Boring IR12MW17A with Well Completion Detail

PLATE

Naval Station, Treasure Island  
 Hunters Point Annex  
 San Francisco, California

DRAWN  
 MF

JOB NUMBER

APPROVED

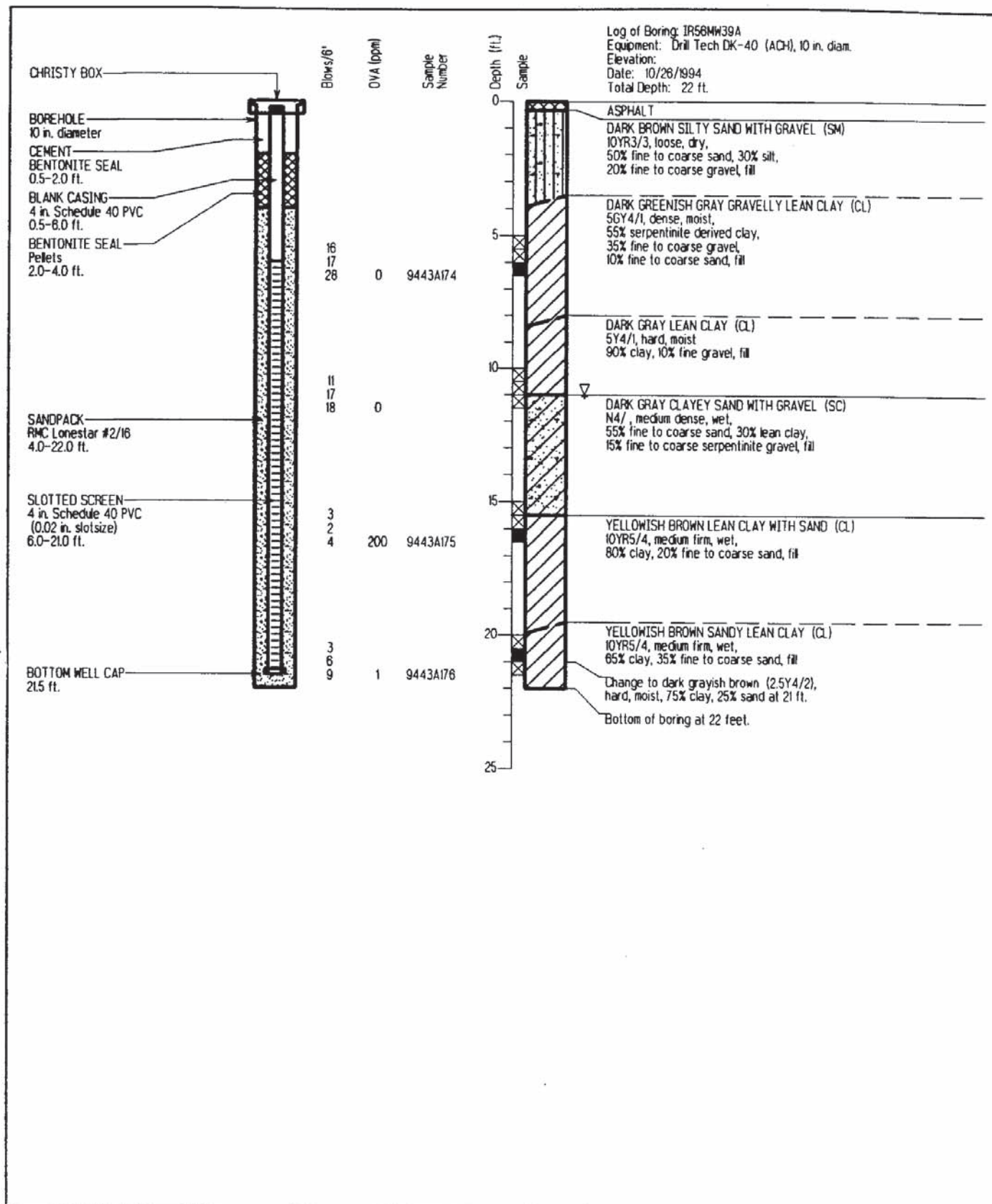
DATE

REVISED DATE

11/30/92



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**Harding Lawson Associates**  
 Engineering and  
 Environmental Services

Log of Boring and Well Completion IR56MW39A

PLATE

Engineering Field Activity West  
 Hunters Point Annex  
 San Francisco, California

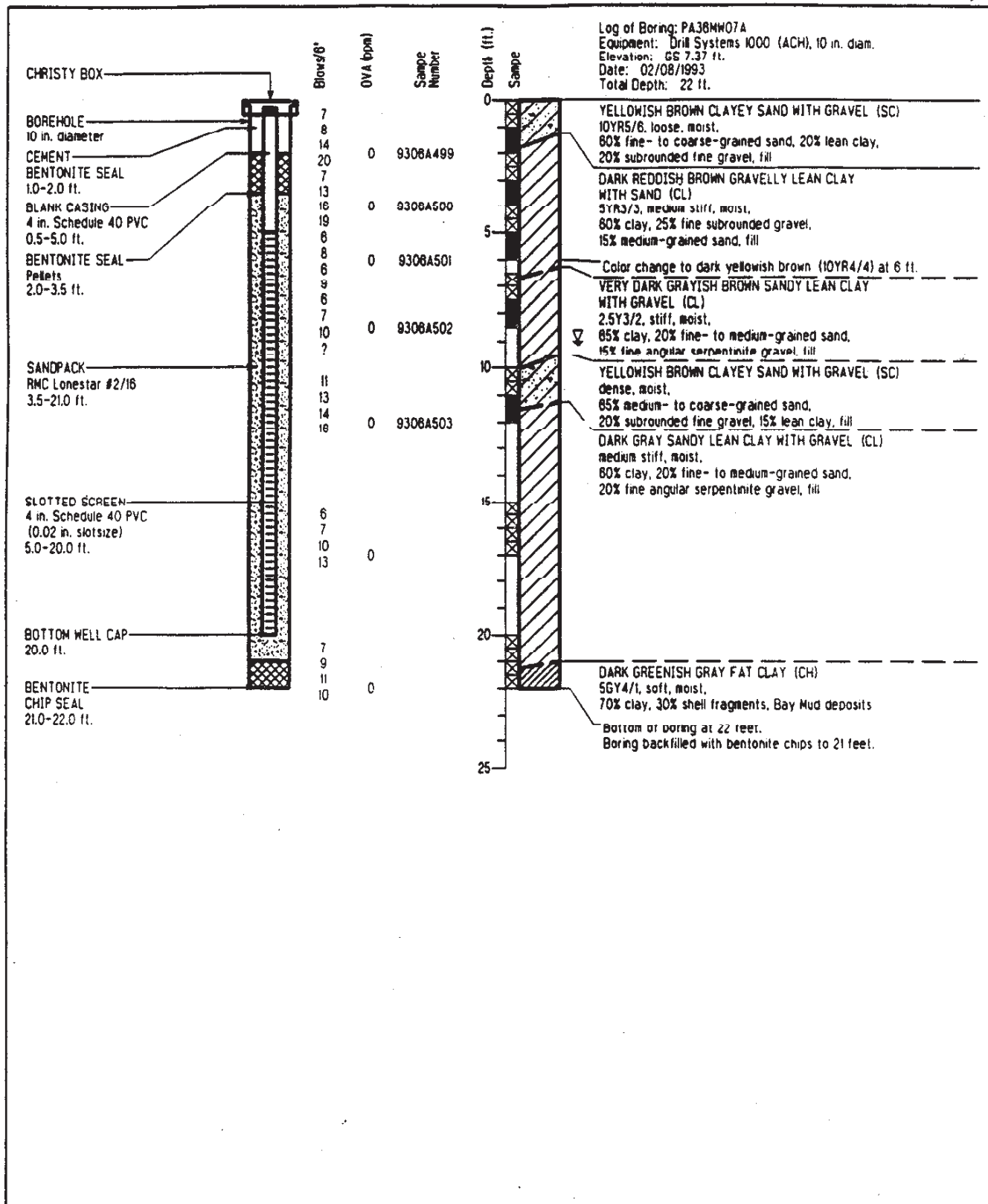
DRAWN JOB NUMBER  
 klr 11400 1426

APPROVED

DATE  
 12/94

REVISED DATE

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Harding Lawson Associates  
 Engineering and  
 Environmental Services

Log of Boring and Well Completion PA38MW07A  
 Naval Station, Treasure Island  
 Hunters Point Annex  
 San Francisco, California

PLATE

DRAWN  
LRH

JOB NUMBER  
11400 090403

APPROVED

DATE  
11/93

REVISED DATE

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Date Completed: 6/25/04

Logged By: S. Titus (Brown &amp; Caldwell)

Total Depth: 55.0 ft

Drilling method: Sonic Rig

Hammer Wt:

Notes: Borehole logged from Sonic Core. The lithologic descriptions and USCS classifications are based entirely on visual/manual procedures.

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) PID/FID	USCS	Description	Remarks	Well Construction
1					0.0		Sand Silt with Gravel (SP-SM) - very dark grayish brown (10yr 3/2), dry, soft, 35-40% fine sand, 10-15% fine and coarse gravel		
2									
3									
4					0.1		Silty Sand with Gravel (SW-SM) - dark yellowish brown (10yr 3/6), dry, loose, 50-55% fine to coarse sand, 15-20% fine-coarse gravel, trace brick material, well graded		
5					0.1		Silty Sand with Gravel (SP-SM) - very dark gray (2.5y 3/1), damp, loose, 50-55% fine to medium grained sand, 15-20% serpentinite gravel (fine to coarse), some FeO <sub>2</sub> staining		
6					0.1		- same as above		
7									
8									
9									
10					0.1		Silty Sand with Gravel (SW-SM) - very dark greenish gray (10G 3/1), damp, loose, 45-50% fine to coarse grained sand, 30-35% silt, 20-25% fine to coarse gravel (serpentinite gravel), trace FeO <sub>2</sub> staining, well graded		
11							No Recovery		
12									
13									
14									
15					0.1		Silty Clay with Sand and Gravel (CL) - greenish black (10G 2.5/1), moist, soft, medium plasticity, 15-20% fine grained sand, 15-20% fine to coarse gravel (serpentinite gravel), lean clay		
16									
17					0.1		Silty Sand with Gravel (SW-SM) - very dark greenish gray (10G 3/1), very moist to saturated, loose, 50-55% fine to coarse grained sand poorly sorted, 20-25% fine to coarse gravel, trace FeO <sub>2</sub> staining, well graded		
18									
19					0.1		Sandy Clay (CL) - dark gray (10yr 4/1), moist, medium stiff, medium plasticity, 30% fine grained sand, trace medium to coarse sand,		
20									



KLEINFELDER

PROJECT NO. 41330

## LOG OF BORING NO. IR01MW366B

Hunters Point Naval Shipyard  
Parcel E  
San Francisco, CA.

PLATE

L:\2004\04\PROJECTS\41330\41330\_E-PARCEL.GPJ

9/1/04 11:37:42 AM

Date Completed: 6/25/04

Logged By: S. Titus (Brown &amp; Caldwell)

Total Depth: 55.0 ft

Drilling Method: Sonic Rig

Hammer Wt:

Notes: Borehole logged from Sonic Core. The lithologic descriptions and USCS classifications are based entirely on visual/manual procedures.

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) PID/FID	USCS	Description	Remarks	Well Construction
21							10-15% fine to coarse gravel (serpentinite gravel), lean clay		
22					0.1		Gravelly Sand with Silt (SP-SM) - dark gray (10yr 4/1), saturated, loose, 20-25% gravel, 55-60% fine grained sand, 5-10% coarse grained sand		
23					0.1		Sandy Clay (CL) - dark gray (2.5y 4/1), damp/moist, soft, high plasticity, 20-25% fine grained sand, trace coarse sand, lean clay		
24							- same but color change to dark grayish brown (2.5y 4/2), moist to very moist		
25					0.1		Gravelly clay with Sand (CL) - very dark grayish brown (2.5y 3/2), damp, medium stiff, medium plasticity, 10-15% fine grained sand, 20% fine gravel, trace coarse gravel (serpentinite gravel), trace FeO <sub>2</sub> staining, lean clay		
26					0.1		- same as 22'-25'		
27									
28									
29									
30					0.1		Silty Sand with Gravel (SW-SM) - very dark greenish gray (10G 3/1), moist, loose, 50-55% fine to coarse grained sand poorly sorted, 20-25% fine to coarse gravel (serpentinite gravel), some FeO <sub>2</sub> staining, well graded sand		
31					0.1		Clay (CH) - very dark gray (2.5y 3/1), moist, soft, high plasticity, trace shell fragments, fat clay		
32									
33									
34									
35									
36									
37									
38									
39									Bentonite Chip Seal
40									



KLEINFELDER

PROJECT NO. 41330

## LOG OF BORING NO. IR01MW366B

Hunters Point Naval Shipyard  
Parcel E  
San Francisco, CA.

PLATE

(cont'd)



Date Completed: 6/25/04

Logged By: S. Titus (Brown &amp; Caldwell)

Total Depth: 55.0 ft

Drilling Method: Sonic Rig

Hammer Wt:

Notes:

Borehole logged from Sonic Core. The lithologic descriptions and USCS classifications are based entirely on visual/manual procedures.

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) PID/FID	USCS	Description	Remarks	Well Construction
41									
42									
43					0.1		Clayey Sand (SC) - very dark gray (2.5y 3/1), very moist, medium dense, 70-75% fine to medium grained sand, trace shell fragments material, trace fine gravel		
44									Stainless Steel Centralizer at 43'
45	0426T002	⊗			0.1		Sand with Gravel (SP) - very dark gray (10yr 3/1), saturated, loose, 90-95% fine grained sand, 5-10% fine gravel, trace silt, well sorted sand		
46									
47					0.1		Sand (SP) - very dark gray (10yr 3/1), very moist to saturated, dense, 95% fine grained sand, trace silt, trace medium grained sand, well sorted sand		
48									4" SCH 40 PVC screened slot size .020 Sand 2/16
49									
50					0.1		Sand (SP) - olive gray (5y 4/2), moist, dense, fine grained sand, trace silt, trace FeO2 staining, well sorted sand		
51					0.1		- same but color change to light olive brown (2.5y 5/4), increase to some FeO2 staining (increases with depth)		
52									
53									Stainless Steel Centralizer at 53'
54									
55								Bottom of Boring = 55 feet	
56									
57									
58									
59									
60									



KLEINFELDER

PROJECT NO. 41330

## LOG OF BORING NO. IR01MW366B

Hunters Point Naval Shipyard  
Parcel E  
San Francisco, CA.

PLATE

(cont'd)



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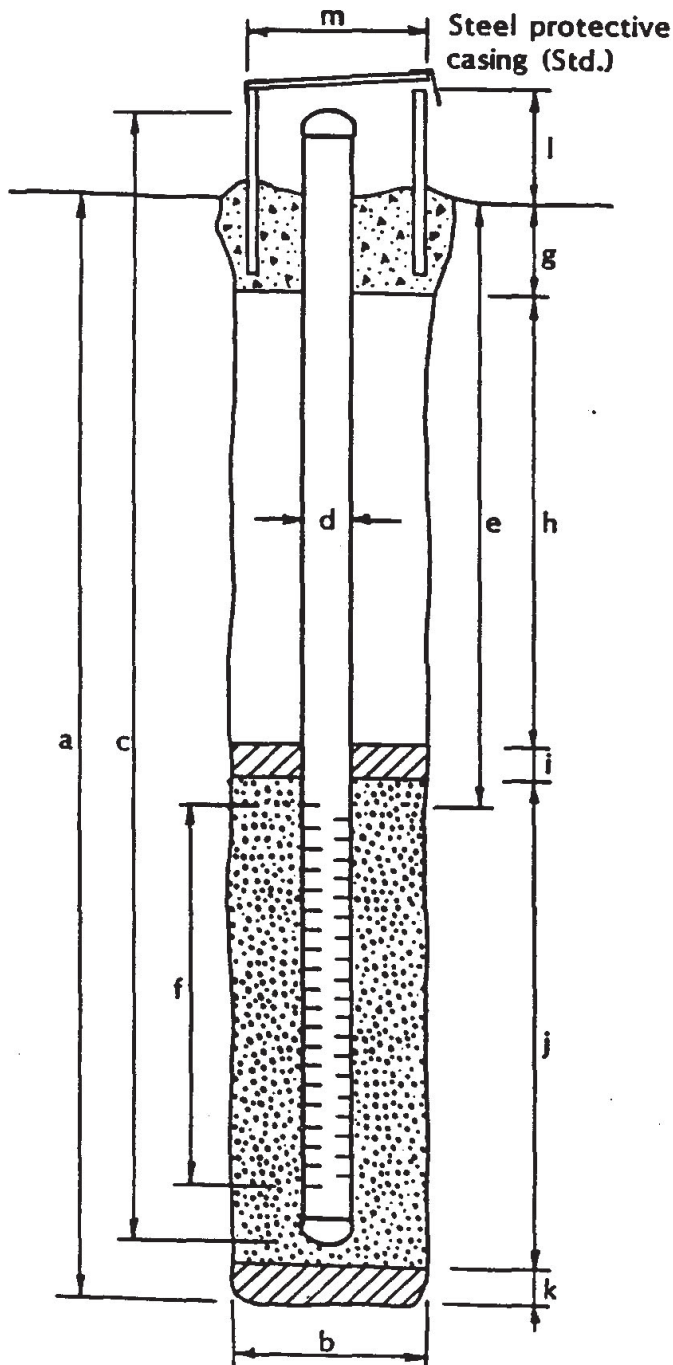
SURFACE ELEV. \* 109.52'

PLATE E24

# WELL DETAILS



PROJECT NUMBER 365-02.02 BORING / WELL NO. 107  
 PROJECT NAME HPNS-Industrial Landfill TOP OF CASING ELEV. 109.52'  
 COUNTY San Francisco GROUND SURFACE ELEV. 108'±  
 WELL PERMIT NO. \_\_\_\_\_ DATUM Navy

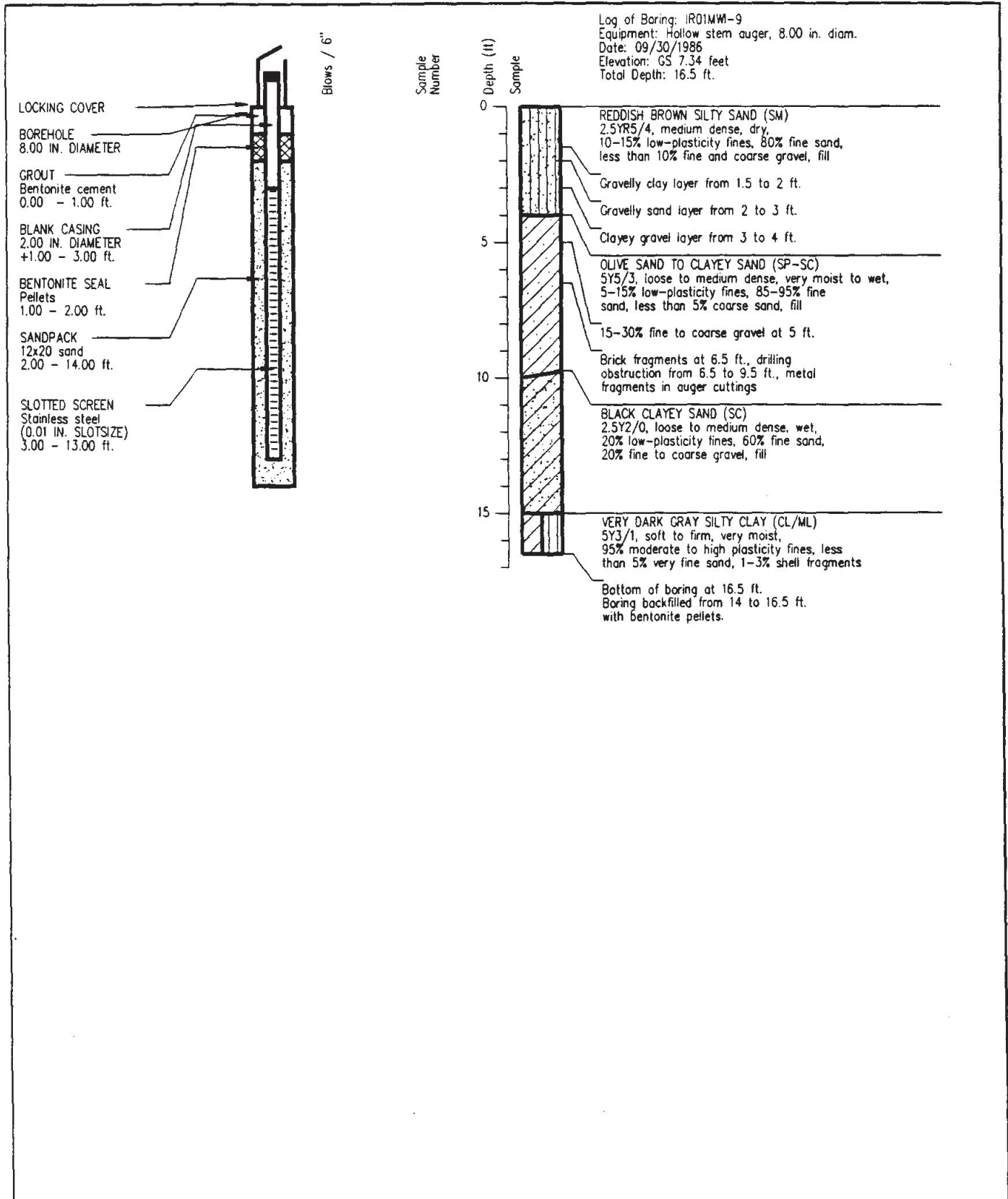


## EXPLORATORY BORING

a. Total depth 13 ft.  
 b. Diameter 8 in.  
 Drilling method Hollow-stem auger

## WELL CONSTRUCTION

c. Casing length 13.5 ft.  
 Material stainless steel  
 d. Diameter 2 in.  
 e. Depth to top perforations 3 ft.  
 f. Perforated length 10 ft.  
 Perforated interval from 13 to 3 ft.  
 Perforation type screen  
 Perforation size 0.010 inch  
 g. Surface seal (1 - 0') 1 ft.  
 Seal material cement-bentonite grout  
 h. Backfill - ft.  
 Backfill material cement-bentonite grout  
 i. Seal (2 - 1') 1 ft.  
 Seal material bentonite  
 j. Gravel pack ( $9\frac{1}{2}$  - 2') 7.5 ft.  
 Pack material 12x20 sand  
 k. Bottom seal N/A ft.  
 Seal material N/A  
 l. Casing height 1 ft.  
 m. Protective casing diameter 10 in.  
 Boring caved to 9.5 feet when augers removed.



Harding Lawson Associates  
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Log of Boring IR01MWI-9 with Well Completion Detail  
 Naval Station Treasure Island  
 Hunters Point Annex  
 San Francisco, California

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DATE  
 12/93

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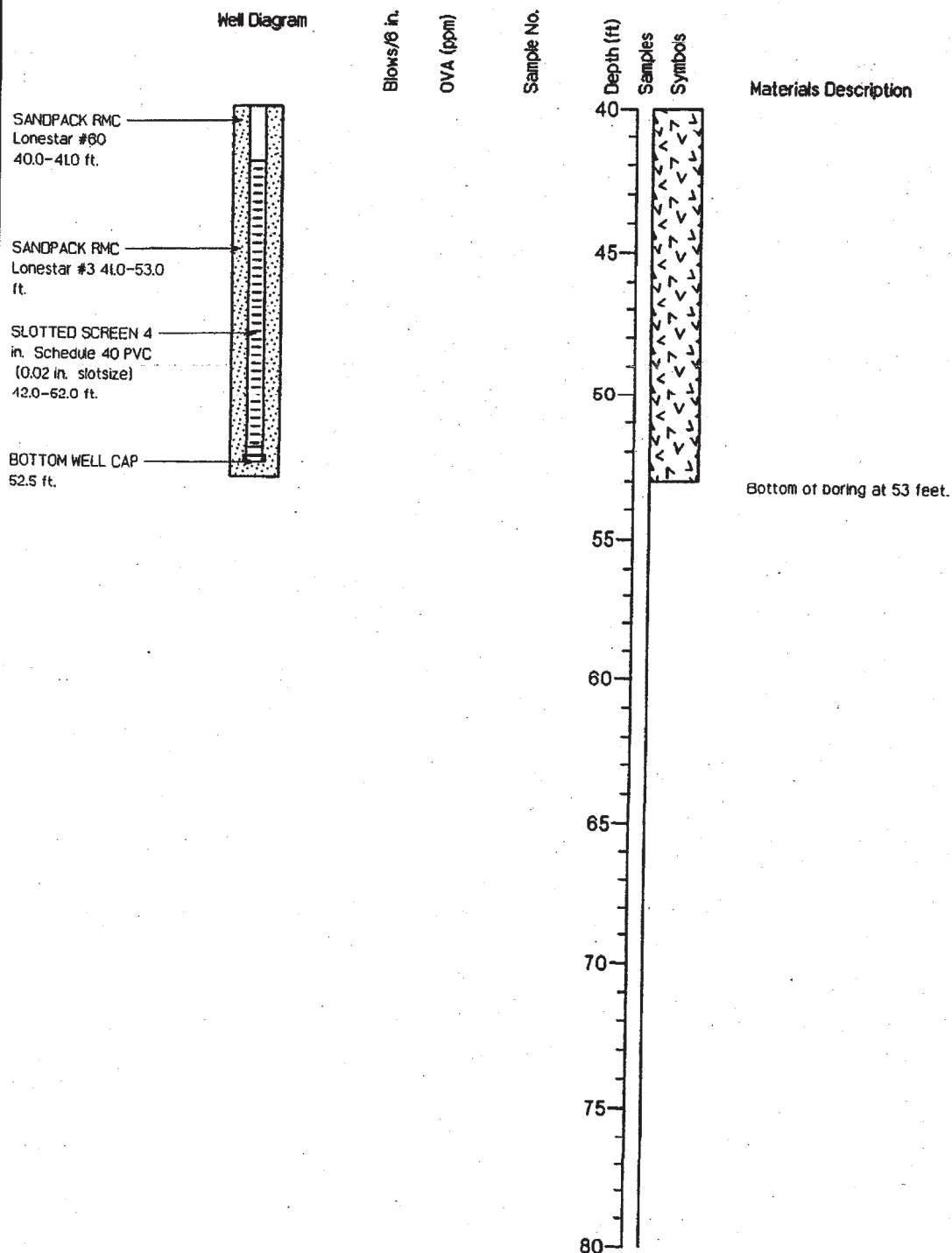
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Adapted from Harding Lawson Associates

**LOG OF BORING IR06MW54F**

Page 2 of 2



Project Number	11400 1402	Date Drilled	12/09/1993	Figure
Project Name	Parcel B RI Report	GS Elevation	35.86 ft.	
Project Task	Hunters Point Annex	Water Level	None Encountered	
Project Location	San Francisco, California	Total Depth Of Hole	53 ft.	
Equipment	Drill Systems 1000 (ACH), 10 in. diam.			

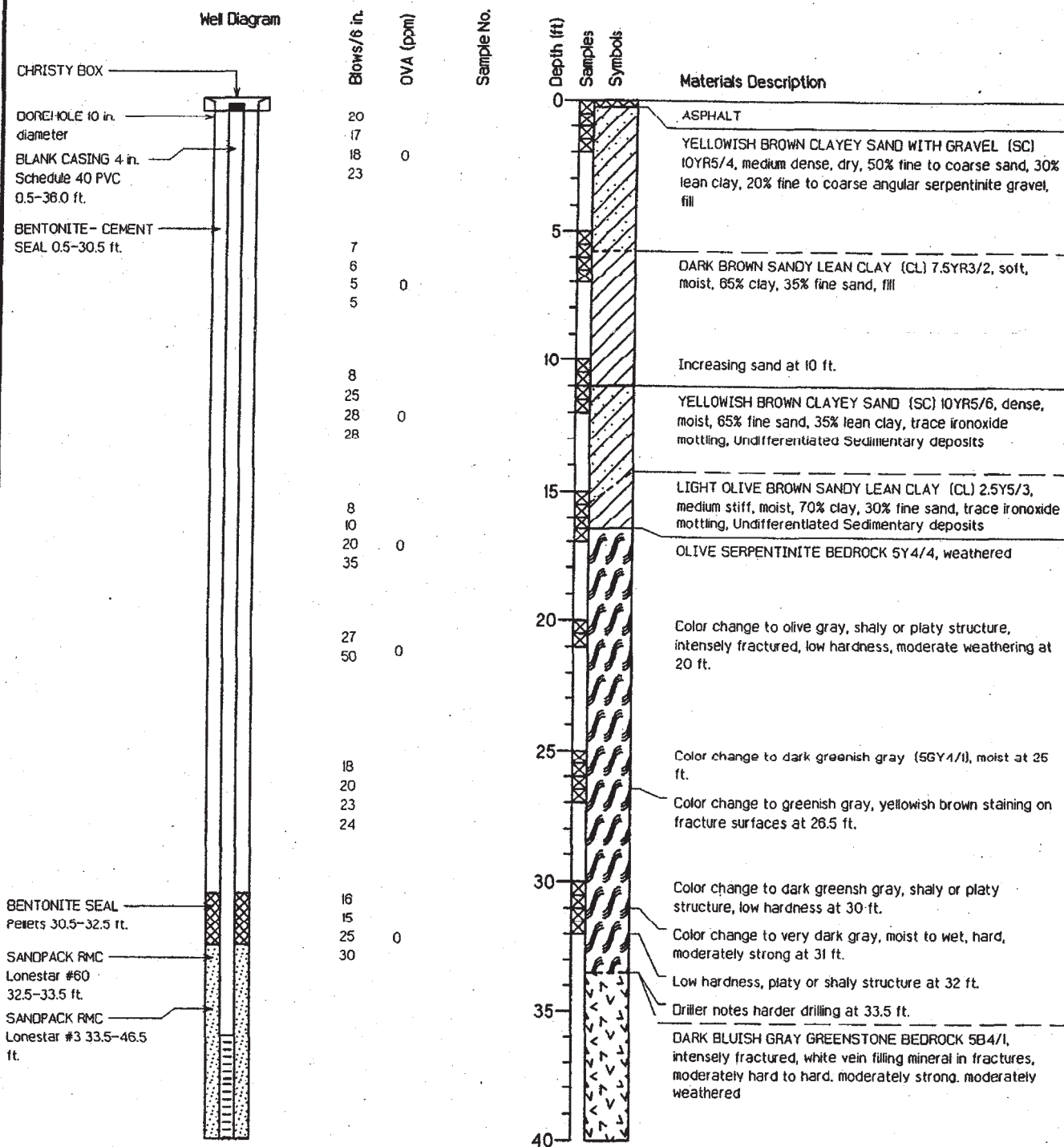
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**LOG OF BORING IR06MW55F**

Page 1 of 2



Project Number 11400 1402

Project Name Parcel B RI Report

Project Task Hunters Point Annex

Project Location San Francisco, California

Equipment Drill Systems 1000 (ACH), 10 in. diam.

Date Drilled 12/09/1993

GS Elevation 32.94 ft.

Water Level None Encountered

Total Depth Of Hole 46.5 ft.

Figure

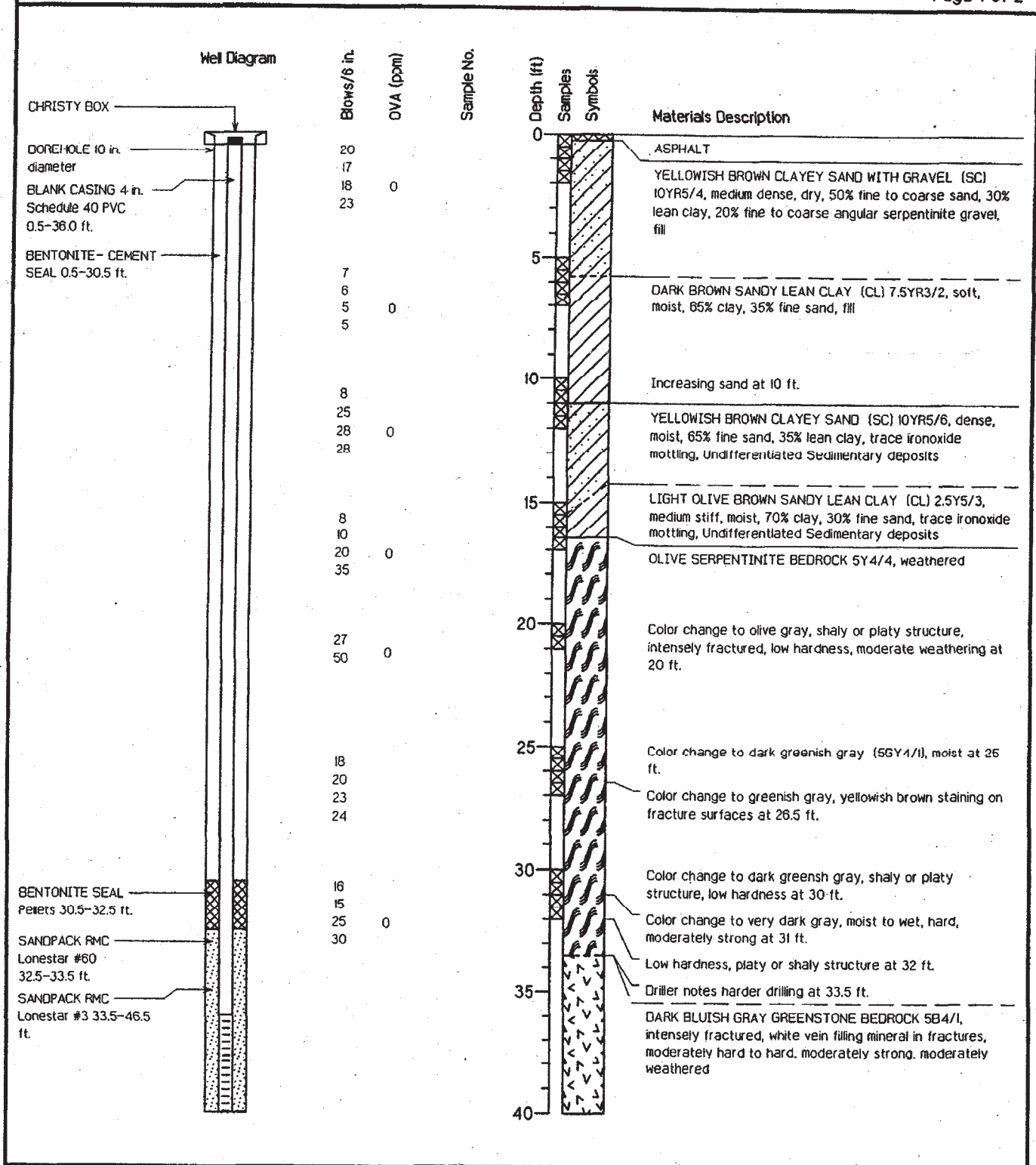


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**LOG OF BORING IR06MW55F**

Page 1 of 2



Project Number	11400 1402	Date Drilled	12/09/1993
Project Name	Parcel B RI Report	GS Elevation	32.94 ft.
Project Task	Hunters Point Annex	Water Level	None Encountered
Project Location	San Francisco, California	Total Depth Of Hole	46.5 ft.
Equipment	Drill Systems 1000 (ACH), 10 in. diam.		

Figure

**PAC Environmental Management, Inc.**

Adapted from Harding Lawson Associates

**LOG OF BORING IR06MW55F**

Page 2 of 2

**Well Diagram**

SLOTTED SCREEN 4  
in. Schedule 40 PVC  
(0.02 in. slotsize)  
38.0-46.0 ft.

BOTTOM WELL CAP  
46.5 ft.



Blows/8 in.

OVA (ppm)

Sample No.

Depth (ft)

Samples

Symbols

Materials Description

40  
45  
50  
55  
60  
65  
70  
75  
80



Bottom of boring at 46.5 feet.

Project Number	11400 1402	Date Drilled	12/09/1993	Figure
Project Name	Parcel B RI Report	GS Elevation	32.94 ft.	
Project Task	Hunters Point Annex	Water Level	None Encountered	
Project Location	San Francisco, California	Total Depth Of Hole	46.5 ft.	
Equipment	Drill Systems 1000 (ACH), 10 in. diam.			

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## **Appendix C: Regulatory Correspondence**

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**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Nina Bacey, DTSC RPM

Date of Comments: November 7, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**GENERAL COMMENTS**

No.	Section/Page	Comment (11/7/18)	Response (11/27/18)	Comment (12/10/18)	Response
1	Not Applicable	Please refer to DTSC Guidance Well Design and Construction for Monitoring Groundwater at Contaminated Sites (2014) when making revisions to the work plan per DTSCs comments. <a href="https://www.dtsc.ca.gov/PublicationsForms/upload/Well_Design_Constr_for_Monitoring_GWContam_Sites1.pdf">https://www.dtsc.ca.gov/PublicationsForms/upload/Well_Design_Constr_for_Monitoring_GWContam_Sites1.pdf</a>	The DTSC Guidance Well Design and Construction for Monitoring Groundwater at Contaminated Sites has been reviewed and updates to the work plan were made per DTSCs and the EPAs comments.	No Additional Comments	
2	Not Applicable	The screen of newly installed wells should be no longer than 10 ft per DTSC guidance.	Replacement and newly installed monitoring wells will have screen lengths that are no longer than 10 feet. Replacement monitoring wells will have the same screen lengths of the monitoring well they are proceeding with the exception of monitoring wells IR12MW14A, IR56MW39A and PA36MW07A which previously had screen lengths of 15 feet but will be modified to meet the DTSC guidance.  Section 3.4.1 New Monitoring Well Installation has been updated to state:  “and up to 10-feet of screen...”  Section 3.4.2 Replacement Monitoring Well Installation has been updated to state:  “The screen interval in monitoring wells IR12MW14A, IR56MW39A and PA36MW07A will be modified to meet current US EPA and DTSC standards (DTSC 2014). These wells will be constructed using 10 feet of screen interval instead of 15 feet.”	No Additional Comments	
3	Not Applicable	Section 3.4.2 - Indicates replacement monitoring wells will be constructed as similar as feasibly possible to the wells they are superseding. Depth of wells and screen locations should be similar to the wells they are replacing, but please note that the construction of the wells should also follow current DTSC guidelines.	Replacement monitoring wells will be constructed as similar as feasibly possible. The screen length for monitoring wells IR56MW39A and PA36MW07A will be modified to fit the current DTSC guideline of no longer than 10 feet.  Section 3.4.2 Replacement Monitoring Well Installation has been updated to state:  “The screen interval in monitoring wells IR12MW14A, IR56MW39A and PA36MW07A will be modified to meet current US EPA and DTSC standards (DTSC 2014).”	No Additional Comments	

RESPONSE TO COMMENTS

Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018

Comments by: Nina Bacey, DTSC RPM

Date of Comments: November 7, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

GENERAL COMMENTS

No.	Section/Page	Comment (11/7/18)	Response (11/27/18)	Comment (12/10/18)	Response
4	Not Applicable	The Work Plan indicates that four wells were unable to be located so they will be replaced. Please indicate when the Navy plans to further investigate the location of these wells so that they can be properly closed.	The Navy has investigated the location of the four monitoring wells over the past four basewide groundwater monitoring and gauging events. Based on the remedial activities occurring in the vicinity of these monitoring wells it has been determined that they have inadvertently been destroyed by construction activities. The Navy plans on replacing these four monitoring wells to continue monitoring the compounds of concerns and to assist with ongoing remedial activities.	The response to DTSC General Comment #4 (submitted November 7, 2018) does not address the question. DTSC was requesting when the missing wells would be located and properly closed, and the response indicated that they would be replaced. Section 3.4.2 now indicates that 8 wells that were destroyed by construction activities will be located using a GPS unit or a land surveyor. Do these include the same wells? Please clarify in the text what will be done with them once located.	Section 3.4.2 has been updated to state:  “A licensed land surveyor or a global positioning system unit will be used to mark <i>the locations of the replacement monitoring wells. A geophysical crew will clear each borehole location for utilities and attempt to locate the original monitoring well. If any original monitoring wells are located, they will be properly destroyed as described in Section 3.3.</i> ”

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Nina Bacey, DTSC RPM

Date of Comments: November 7, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**SPECIFIC COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment (11/7/18)</b>	<b>Response (11/27/18)</b>	<b>Comment (12/10/18)</b>	<b>Response</b>
1	Section 3.3	When decommissioning groundwater monitoring wells, will the grout be backfilled/pressure fed using a tremie pipe? The text should be revised to indicate this information.	Section 3.3 Monitoring Well Destruction has been updated to state:  “After the total depth has been reached, the well casing, sand, and annular material will be removed, and the boring will be backfilled with cement-bentonite grout. <i>A tremie pipe will be placed at the bottom of the borehole and pressurized cement-bentonite grout will be forced out through the tremie pipe up the inside of the borehole. The bottom of the tremie pipe will be kept submerged in the grout column while slowly withdrawing the tube as the borehole fills with grout.</i> ”	No Additional Comments	
2	Section 3.4.1	Recommend including a transition sand between the filter pack and the bentonite seal.	Section 3.4.1 New Monitoring Well Installation does state there will be a transition seal used; to clarify the paragraph has been update to state:  “ <i>An annular transition seal will be constructed above the filter pack using at least 2 feet of commercially-manufactured, solvent-free, uncoated sodium bentonite pellets and hydrated in place using potable water. The transition seal will consist of bentonite pellets or chips that will be hydrated after emplacement and allowed to set before the annular seal is put in place.</i> ”	No Additional Comments	
3	Section 3.4.1	The transition seal (bentonite seal) must be a minimum of 2 ft. This is shown in Figure 4 but is not indicated in the text. Please include in the text.	Section 3.4.1 New Monitoring Well Installation has been revised as follows to indicate there will be a minimum of 2 feet for the transitions seal:  “ <i>An annular transition seal will be constructed above the filter pack using at least 2 feet of commercially-manufactured, solvent-free, uncoated sodium bentonite pellets and hydrated in place using potable water.</i> ”	No Additional Comments	
4	Section 3.4.1	The size of the surface completion concrete pads are not indicated. This must be included and follow DTSC guidelines.	Section 3.4.1 New Monitoring Well Installation has been revised to indicate the size of the surface completion concrete pads:  “ <i>The flush to the ground surface completions will be completed with a 12-inch-diameter, watertight, steel vault installed flush with the ground surface and secured in a 3-foot-square concrete pad sloped to divert surface drainage. The above ground surface completions will be completed with a well apron extending two feet in all directions from the protective casing. The well apron will be at least 4-inches thick and slope away from the casing to drain surface water radially away from the protective casing and to prevent leakage down the outer wall of the protective casing.</i> ”  Figure 4 has also been updated to be consistent with Section 3.4.1	No Additional Comments	



**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Nina Bacey, DTSC RPM

Date of Comments: November 7, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**SPECIFIC COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment (11/7/18)</b>	<b>Response (11/27/18)</b>	<b>Comment (12/10/18)</b>	<b>Response</b>
5	Section 4.3	Water must be profiled prior to discharge to sewer system or waste facility. Please include information about profile sampling in the text.	<p>Section 4.3 has been updated to include additional information about profile sampling and waste disposal procedures:</p> <p><i>“When well installation and decommissioning activities are completed one water sample will be collected and profiled. The water sample will be analyzed for the analytical requirements of the San Francisco Public Utility Commission discharge permit (SFPUC 2018). For IDW generated in a radiologically controlled area Trevet will coordinate with the Navy and the Navy's radiological contractor regarding requirements for radiological screening before disposal. Chemical analytical results will be submitted to the San Francisco Public Utilities Commission for review in accordance with an application for a local batch wastewater discharge permit. Wastewater that meets the sanitary district's criteria will be discharged to an onsite sanitary sewer inlet. Wastewater that exceeds the discharge permit criteria will be disposed of at a permitted disposal facility. Solids accumulating in the purge tank, if any, will be drummed, sampled, and disposed of in accordance with proper disposal requirements.”</i></p>	No Additional Comments	
6	Section 1.2	Not Applicable (comment was given in the 12/10/18 response to comments)	Not Applicable	<p>Section 1.2, last paragraph – This paragraph needs clarification. Suggested revision:</p> <p>If any additional well destruction or installation activities are required while conducting the work described in this work plan, they will be presented to the regulatory agencies in a BGMP monitoring well destruction and installation technical memorandum. The additional well activities will be conducted following the guidelines and procedures outlined in this work plan after discussion and concurrence from the regulatory agencies. All well activities that effect the BGMP will be documented in the subsequent groundwater monitoring report.</p>	<p>Section 1.2, last paragraph has been revised to state:</p> <p><i>“These, and any additional well destruction or installation activities will be presented to the regulatory agencies in a BGMP monitoring well destruction and installation technical memorandum.”</i></p>

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Judy C. Huang, EPA RPM

Date of Comments: November 13, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**GENERAL COMMENTS**

No.	Section/Page	Comment (11/13/18)	Response	Comment (12/20/18)	Response
1	Not Applicable	The Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Shipyard, San Francisco, California, October 2018 (Well Work Plan) indicates that pre-drilling activities will include preparation of an investigation-derived waste (IDW) staging area; however, the Well Work Plan does not discuss where the IDW staging area will be located and none of the figures depict the location of the IDW staging area. Please revise the Well Work Plan to describe where the IDW staging area will be located. Please also revise one of the figures to depict the location of the IDW staging area.	The IDW staging area has been added to Figure 3 and Section 3.2 has been updated to indicate the location of the IDW staging area.  <i>“All IDW will be staged in Parcel C; soil and water will be containerized in Department of Transportation 55-gallon drums that have been set up with secondary containment (Figure 3). For IDW generated in a radiologically controlled area Trevet will coordinate with the Navy and the Navy's radiological contractor regarding requirements for radiological screening before removal from the radiologically controlled area and disposal.”</i>	No Additional Comments	
2	Not Applicable	The Well Work Plan does not include a schedule. Please revise the Well Work Plan to include a schedule outlining periods for the activities planned, such as mobilization, well repairs, well installations, reporting, etc.	The work plan has been revised to include Figure 5 which is project schedule for the work proposed in this work plan. A project management plan section (Section 6) was also incorporated into this work plan to discuss the management structure of the tasks described in this work plan.	The response addressed the comment; however, the text in new Section 6.3 references Figure 6 for the project schedule, but the response and revised list of figures in the Redlin Well Work Plan indicate the project schedule is presented on Figure 5. Please revise Section 6.3 to reference Figure 5 rather than Figure 6.	Section 6.3 has been updated to reference Figure 5 as the project schedule.
3	Not Applicable	The Well Work Plan indicates that of the 10 wells that will be replaced, “the additional 8 will replace monitoring wells that have already been destroyed by on-site remedial or construction activities;” however, it is not clear whether the eight wells that will be replaced have already been decommissioned or if some wells still need to be decommissioned. Specifically, the text should discuss whether wells destroyed by remedial or construction activities have been properly decommissioned. For example, a truck may have hit a well and broken off the stick-up and proper decommissioning may still be necessary. If the eight wells have already been decommissioned, the text should explain how the original locations will be identified so that the replacement wells are placed in the vicinity of the original wells to satisfy monitoring requirements. Please revise the Well Work Plan to clarify whether the eight additional wells that will be replaced have been properly decommissioned. If this is the case, please also revise the Well Work Plan to explain how the original locations will be identified so that the replacement wells satisfy the monitoring requirements associated with the original wells.	<p>The Navy has investigated the status of these 8 monitoring wells over the last four basewide groundwater monitoring events. There has been evidence (pieces of PVC casing and screen, well mounts and boxes, excavation activities in the area of these monitoring wells, etc.) that indicate that these wells have been inadvertently removed during other remedial activities occurring at HPNS. Therefore, these 8 monitoring wells do not need to be decommissioned, only replaced.</p> <p>The 8 monitoring wells to be replaced will be located by a licensed land surveyor prior to drilling activities to ensure the replacement wells are located with 10 feet of the well it is proceeding. Section 3.4.2 has been updated to state:</p> <p><i>“The previous well locations are shown in Figure 3; the replacement monitoring wells will be located approximately 10 feet from the original monitoring well. A licensed land surveyor or a global positioning system unit will be used to locate the 8 monitoring wells that have been destroyed by on-site remediation and construction activities.”</i></p>	No Additional Comments	

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Judy C. Huang, EPA RPM

Date of Comments: November 13, 2018 and December 20, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**SPECIFIC COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment (11/13/18)</b>	<b>Response (11/27/18)</b>	<b>Comment (12/20/18)</b>	<b>Response</b>
1	Section 3.3, Monitoring Well Destruction, Page 3-2 and Figure 3, Monitoring Well to be Installed, Decommissione d, Rehabilitated, or Replaced:	According to the text of Section 3.3, wells IR01MW-7 and IR01MW53B will be decommissioned and replaced, but the legend of Figure 3 indicates that these wells will be decommissioned or replaced. Please revise the Well Work Plan to resolve this discrepancy.	Monitoring wells IR01MW-7 and IR01MW53B will be decommissioned and then replaced. Figure 3 has been updated to be consistent with the text in Section 3.3.	No Additional Comments	
2	Section 3.4.1, New Monitoring Well Installation, Page 3-3 and Table 2, Monitoring Well Construction Details:	The third paragraph of Section 3.4.1 indicates that “up to 20-feet of screen” will be installed for the two new monitoring wells; however, Table 2 indicates that the majority of the wells have screens of 10 to 15 feet and only a few have lengths of 20 feet. The text should be revised to propose 10-foot well screens for the new monitoring wells or to explain why screen lengths of 20 feet are proposed. Please revise Section 3.4.1 to propose 10-foot well screens for the new monitoring wells or to explain why screen lengths of 20 feet are proposed for the two new monitoring wells.	Replacement and newly installed monitoring wells will have screen lengths that are no longer that 10 feet in accordance with the DTSC and EPA guidance.  Section 3.4.1 New Monitoring Well Installation has been updated to state:  “and up to <i>10-feet</i> of screen...”	No Additional Comments	
3	Section 3.5, Monitoring Well Rehabilitation and Repairs, Page 3-4 and Figure 3, Monitoring Well to be Installed, Decommissione d, Rehabilitated, or Replaced	The second paragraph of Section 3.5 states that “Trevet will also replace well boxes or mounts at 13 existing monitoring wells,” but only 12 wells are identified for box replacement on Figure 3 (denoted by grey symbols). Based on the list of wells in Section 3.5, well IR01MW366B appears to be missing from Figure 3. Please revise the Well Work Plan to resolve this discrepancy.	Figure 3 has been revised to be consistent with the Work Plan.	No Additional Comments	

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Judy C. Huang, EPA RPM

Date of Comments: November 13, 2018 and December 20, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**SPECIFIC COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment (11/13/18)</b>	<b>Response (11/27/18)</b>	<b>Comment (12/20/18)</b>	<b>Response</b>
4	Section 3.5, Monitoring Well Rehabilitation and Repairs, Page 3-4 and Table 1, Monitoring Well Installation, Decommission, Rehabilitation, and Repair List	Table 1 indicates that well IR06MW56F will be rehabilitated and have the well box replaced and that IR01MW366B will only be rehabilitated; however, Section 3.5 indicates that well IR06MW56F will only be rehabilitated, while well IR01MW366B will be rehabilitated and have the well box replaced. Please revise the Well Work Plan to resolve these discrepancies.	Table 1 has been revised to be consistent with the Work Plan.	No Additional Comments	
5	Section 4.1, Soil, Page 4-1	Section 4.1 indicates that soil generated during field activities will be sampled for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), metals, and pH prior to disposal; however, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) have also been found in many areas of Hunters Point. Therefore, soil should also be analyzed for PAHs and PCBs. Please revise Section 4.1 to include analysis for PAHs and PCBs.	Section 4.1 has been revised to include PAHs and PCBs in the list of analytes for waste management of the soil created during well decommissioning and installation activities. The revised analytical list is as follows: <ul style="list-style-type: none"> <li>• VOCs using U.S. EPA Method 8260B</li> <li>• Total petroleum hydrocarbons as gasoline, diesel, and motor oil using U.S. EPA Method 8015B modified</li> <li>• Metals and mercury using U.S. EPA Method 6010B/7471A</li> <li>• <i>Polychlorinated biphenyl by U.S. EPA Method 8082</i></li> <li>• <i>Polycyclic aromatic hydrocarbon by U.S. EPA Method 8310</i></li> <li>• pH using U.S. EPA Method 9045D</li> </ul>	No Additional Comments	
6	Figure 2, Parcel Location Map	Parcels UC-1 through UC-3 are not labeled on Figure 2. While the color coding defined in the legend denotes the location of these parcels, all other parcels include labels. Therefore, Parcels UC-1 through UC-3 should also be labeled for consistency. Please revise Figure 2 to include labels for Parcels UC-1 through UC-3.	Figure 2 has been updated to include the labels for Parcels UC-1, UC-2, and UC-3.	No Additional Comments	

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Judy C. Huang, EPA RPM

Date of Comments: November 13, 2018 and December 20, 2018

Date of Response to Comments: November 27, 2018 and December 31, 2018

**SPECIFIC COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment (11/13/18)</b>	<b>Response (11/27/18)</b>	<b>Comment (12/20/18)</b>	<b>Response</b>
7	Section 3.4.2, Replacement Monitoring Well Installation, Page 3-4	Not Applicable (comment was given in the 12/20/18 response to comments)	Not Applicable	The text of Section 3.4.2 has been revised to state that "The screen interval in monitoring wells IR12MW14A, IR56MW39A and PA36MW07A will be modified to meet current US EPA and DTSC standards (DTSC 2014). These wells will be constructed using 10 feet of screen interval instead of 15 feet;" however, the replacement wells may not be comparable if 10-foot screen intervals are used. For example, if the boreholes are drilled to the same depth as the original well, then the replacement well screen may be submerged. If a shallower well is installed, then the samples may be collected at a shallower depth than in the older wells. It is important that replacement wells are constructed similarly to the original wells to ensure that the samples collected from the new wells provide data that is comparable to that from the original wells. It is understood that new wells (in new locations) will have 10 foot screens, but the Redline Well Work Plan should provide justification for changing the well screen intervals for replacement wells and should indicate whether the sampling interval will be different than the original well because the analytical results may be different. Please revise Section 3.4.2 of the Redline Well Work Plan to provide justification for changing the well screen intervals for monitoring wells IR12MW14A, IR56MW39A and PA36MW07A. Please also revise Section 3.4.2 to indicate whether the sampling interval(s) will be different than in the original well.	The Navy will complete replacement monitoring wells for IR12MW14A, IR56MW39A, and PA36MW07A similar to the original wells to ensure the samples collected from the new wells provide data that is comparable to the original wells. Therefore, the bullet point that states the following text has been removed:  <del>"The screen interval in monitoring wells IR12MW14A, IR56MW39A and PA36MW07A will be modified to meet current US EPA and DTSC standards (DTSC 2014). These wells will be constructed using 10 feet of screen interval instead of 15 feet;"</del>

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Tina Low, RWQCB PM

Date of Comments: November 16, 2018

Date of Response to Comments: November 27, 2018

**SPECIFIC COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment</b>	<b>Response</b>
1	Section 3, Scope of Work	This section states that well IR01MW53B was compromised as a result of on-site remedial activities and will be reinstalled. The section does not discuss well IR01MW48A, which is located in close proximity to IR01MW53B. Was IR01MW48A compromised during remedial activities? If so, has it already been repaired or replaced? Please provide the current status of IR01MW48A, including when it was last sampled.	Monitoring well IR01MW48A, located adjacent to monitoring well IR01MW53B, is still in good condition. IR01MW48A was last sampled in September 2018 as part of the BGMP semiannual groundwater sampling event. Additionally, transducer data and a photo of IR01MW48A was collected in October 2018.

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**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Amy Brownell, SFDPH

Date of Comments: November 16, 2018

Date of Response to Comments: November 27, 2018

**MINOR COMMENTS**

<b>No.</b>	<b>Section/Page</b>	<b>Comment</b>	<b>Response</b>
1	Blank pages at the beginning of the report	The fourth and sixth pages, counting from the cover letter of the report, are left blank. Please correct or indicate on these pages “This page intentionally left blank.”	The requested revision was made.
2	Section 1, Introduction, page 1-1, first paragraph, last sentence	The last sentence of the first paragraph states “Trevet prepared this work plan on behalf of the Department of the Navy (DON), Naval Facilities Engineering Command, Southwest (NAVFAC SW), under Contract No. N62473-16-C-2004.” Please correct “Czommand” to “Command.”	The requested revision was made.
3	Section 1.2, Summary, Page 1-2, second paragraph	Please revise “Rehabilitates two monitoring wells” to “Rehabilitate two monitoring wells.”	The requested revision was made.
4	Section 2.1, History, page 2-1, second paragraph	The second paragraph states “In 1992, the Navy divide HPNS into five contiguous parcels (identified as Parcels A through E) to expedite remedial action and land reuse.” Please revise divide to divided.	The requested revision was made.
5	Section 3.3, Monitoring Well Destruction, page 3-2, first sentence	The first sentence states “Two groundwater monitoring wells (IR01MWI-7 and IR01MW53B) that have been compromised as a result of on-site remedial activities, is proposed to be destroyed (Figure 3).” Please revise the sentence to “Two groundwater	The requested revision was made.



**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Amy Brownell, SFDPH

Date of Comments: November 16, 2018

Date of Response to Comments: November 27, 2018

**MINOR COMMENTS**

No.	Section/Page	Comment	Response
		monitoring wells (IR01MWI-7 and IR01MW53B) that have been compromised as a result of on-site remedial activities are proposed to be destroyed (Figure 3)."	
6	Section 3.4.2, Replacement Monitoring Well Installation, page 3-4, second paragraph	The first sentence of the second paragraph states "The previous well locations are show in Figure 3." Please revise to "The previous well locations are shown in Figure 3."	The requested revision was made.
7	Appendix A, Field Forms	This Appendix contains forms with scattered letters on top. Please revise these forms as-necessary.	The requested revision was made.

## RESPONSE TO COMMENTS

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Amy Brownell, SFDPH

Date of Comments: November 16, 2018

Date of Response to Comments: November 27, 2018

## SPECIFIC COMMENTS

No.	Section/Page	Comment	Response
1	Section 3.4.1, New Monitoring Well Installation, page 3-3, second paragraph	The second paragraph states that “up to 20 feet of screen” will be installed at new monitoring wells IR28MW276A and IR28MW277A. Does this mean that 20 feet of screen will be used or less? Please provide well construction details in Table 2 and add rationale for using 20 feet of screen.	<p>Replacement and newly installed monitoring wells will have screen lengths that are no longer than 10 feet. Replacement monitoring wells will have the same screen lengths of the monitoring well they are proceeding with the exception of monitoring wells IR12MW14A, IR56MW39A and PA36MW07A which previously had screen lengths of 15 feet but will be modified to meet the DTSC and EPA guidance.</p> <p>Section 3.4.1 New Monitoring Well Installation has been updated to state:</p> <p>“and up to 10-feet of screen...”</p> <p>The well construction details for the new monitoring wells will be decided during drilling activities based on the lithology and depth to groundwater encountered. Section 3.4.1, paragraph 1 has been updated to state:</p> <p><i>“These wells are going to be drilled to approximately 20 feet below ground surface and will be screened in the A-Aquifer in Parcel C; the screened interval will be approximately 10 to 20 feet below ground surface. Actual screened interval depth may vary depending on the lithology and depth to groundwater at each location.”</i></p>

## RESPONSE TO COMMENTS

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Amy Brownell, SFDPH

Date of Comments: November 16, 2018

Date of Response to Comments: November 27, 2018

### SPECIFIC COMMENTS

No.	Section/Page	Comment	Response
2	Section 3.4.2, Replacement Monitoring Well Installation, page 3-4, second paragraph, and Figure 3 Monitoring Wells to be Installed, Decommissioned, Rehabilitated, or Replaced	The second paragraph states “the replacement wells will be located approximately 10 feet from the original monitoring well.” Please update this statement to reflect the designated locations for these wells that were already accepted by the BCT. The proposed locations for wells IR06MW54FR and IR06MW55FR were separately identified on Robinson Street in attached Drawing C4.0, Artists Parcel Mass Grading Demo and Utility Plans Composite Utility Map, that was sent to the Navy on 9/27/18 and accepted by the BCT in August 2018. Please update the well locations for IR06MW54FR and IR06MW55FR on Figure 3 to be consistent with the locations depicted on Drawing C4.0.	<p>Section 3.4.2 has been updated to state:</p> <p>“The previous well locations are shown in Figure 3. The replacement monitoring wells will be located approximately 10 feet from the original monitoring well <i>with the exception of monitoring well IR06MW54FR and IR06MW55FR which will be located as identified in the Final Restricted Activities Work Plan, Hunters Point Artists Parcel Project, Navy Parcels B-1, C, and UC-2 report due to construction activities in the area (Geosyntec 2016).</i>”</p> <p>The well locations shown in Figure 3 are previous well locations; the well locations for IR06MW54F and IR06MW55F were left in their original locations on Figure 3.</p>
3	Section 3.4.2, Replacement Monitoring Well Installation and Table 2 Monitoring Well Construction Details, page 3-4, First Paragraph	The first paragraph states “The replacement monitoring wells...will be constructed similar to wells they are replacing.” Replacement wells IR06MW54FR and IR06MW55FR must be constructed differently than the initial construction to accommodate the elevation changes made during construction for the Hunters Point Artists Project (HPAP). Please see Sections 4.7 and Appendix F of Geosyntec Consultant’s April 2016 Final Restricted Activities Work Plan HPAP Project Parcels B-1, C, and UC-2 for the new well specifications (attached). Please update the	<p>Monitoring wells IR06MW54FR and IR06MW55FR well construction will accommodate the elevation changes made during construction of the Hunters Point Artists Project. Section 3.4.2 has been updated to state:</p> <p>“<i>Monitoring wells IR06MW54FR and IR06MW55FR well construction will accommodate the elevation changes made during construction of the Hunters Point Artists Project (Geosyntec 2016).</i>”</p> <p>Table 2 is existing monitoring well construction details; the title of the table has been updated to be: <b><i>Existing Monitoring Well Construction Details</i></b></p>

**RESPONSE TO COMMENTS**

*Response to Comments on the Draft Monitoring Well Installation, Destruction, Rehabilitation, and Repair Work Plan, Hunters Point Naval Shipyard, San Francisco, California. October 2018*

Comments by: Amy Brownell, SFDPH

Date of Comments: November 16, 2018

Date of Response to Comments: November 27, 2018

**SPECIFIC COMMENTS**

No.	Section/Page	Comment	Response
		construction details for monitoring wells IR06MW54F and IR06MW55F in Table 2 accordingly.	The installation report will contain a new table detailing construction details of the two new monitoring wells and the ten replacement monitoring wells.
T4	Section 3.4.2, Replacement Monitoring Well Installation	This section states the replacement monitoring wells will be advanced using a hollow stem auger drill rig. Wells IR06MW54FR and IR06MW55FR will be installed into serpentinite and greenstone bedrock. Please confirm hollow stem auger equipment is sufficient to auger through the bedrock or if specialized drilling equipment is needed.	The work plan has been updated in Sections 3.3, 3.4.1, and 3.4.2 to reference both hollow stem auger and sonic drilling methods.
5	Section 4.1, Soil, Page 4-1, Third Bullet	Please revise the third bullet from "Metals and mercury using U.S. EPA Method 6010B/7471A" to "CAM 17 Metals and mercury using U.S. EPA Method 6010B/7471A."	The requested revision was made.
6	Section 4.3, Decontamination and Development Water, Page 4-2	Section 4.3 states "decontamination and development water will be periodically discharged to the sanitary sewer under Trevet's San Francisco Public Utilities Commission wastewater discharge permit." Please clarify if this water needs to be analyzed for the analytical requirements of the SFPUC discharge permit? Otherwise, please explain why no analytical testing is specified.	Section 4.3 has been revised to state:  <i>"The water sample will be analyzed for the analytical requirements of the San Francisco Public Utilities Commission discharge permit (SFPUC 2018)."</i>

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